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DEPARTMENTS.


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## EDITORIAL.

THE EVOLUTION of a mining industry brings about some curious changes in local opinion. A few years ago the town of Marysville, in California, was the center of the anti-debris agitation and the headquarters of factional opposition to the mining industry. The development of gold dredging, however, has changed all that. The ground around Oroville and Marysville has been found to be valuable for this system of mining, and in fact all Yuba county is being given over to the dredges. The latest development is the organization of the Yuba River Tract Company, under which title some large interests operating in the county have been consolidated. This company will have its headquarters at Marysville, which promises to be an important dredge-mining center.

THE ARTICLE on cyaniding practice in the Black Hills, published partly in the last number of the JOURNAL, and partly on another page of the present issue, gives a valuable account of the latest developments in a district in which the cyanide process has become a valuable element in gold production. The carefully prepared tables deserve study by those who are interested in the process and its latest applications.

WE HAVE HERETOFORE referred to the arrival of the first detachments of Chinese coolies at Johannesburg. The other end of the supply system for these laborers is described in an interesting note, which we publish on another page, and for which we are indebted to an American mining engineer who has had much experience in China. It will be seen from this account that there is no apparent difficulty in securing as many laborers as may be needed; in fact, the number of applications is so great that the officials in charge of the shipment are able to pick their men, and to reject those who are apparently not well fitted for the work. For the present, at least, the terms of the contract officially agreed upon are being strictly carried out, and both Chinese and Transvaal representatives supervise the sending of the outgoing coolies. The results of their employment in the mines are yet to be shown by experience. It is an experiment on a large scale

in labor, and it must be said that the future is involved in some doubt, notwithstanding the present enthusiasm of the mine-owners over the new supply. However, there is no doubt that from the point of view taken by the mining companies the great need of the Witwatersrand at present is additional labor, and they have gone to the only point where it could be readily obtained.

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ONE OF THE RESULTS of the coal miners' strike in Alabama is the probable introduction of machine mining in that State on a considerable scale. Hitherto most of the coal mining done in Alabama has been pick mining, and machines have been but little employed. This was largely due to the nature of the coal-fields and to the fact that labor was generally abundant and mining rates more moderate than in some of the Western States. Now, however, the strike and the troubles which preceded it have convinced the larger companies of the necessity of economizing in labor. By far the greater part of the Alabama output is used in the State in the manufacture of iron and steel. While the prices of iron were high and profits large, a high coal mining rate was not particularly objectionable; but when the fall in iron prices came, and the necessity for reduction in costs followed, which the miners refused to accede to, other steps had to be considered. It is stated that the work of the Tennessee Coal, Iron & Railroad Company, with machines in some of its mines which are still running—being operated by convicts—is showing very successful results, and machines are being ordered by several other companies. It is quite possible, therefore, that this strike may result in important changes in Alabama coal mining methods.

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VARIOUS ANTHRACITE mining companies in Pennsylvania seem likely to be put to considerable trouble in fighting suits, brought against them by counties, cities, or boroughs, to prevent the dumping or escape of culm into the Susquehanna river and its tributaries. It would not be surprising if some such situation developed as confronted hydraulic mining in California and lead to the shutting down of many hydroulic mines—though, by reason of the comparatively small amount of culm that escapes from settling dams, the situation is not likely to become acute, and no anthracite mines will probably be closed. Law suits of this nature have been brought occasionally by individuals for many years. Formerly it was thought that the mine waters charged with iron and aluminum sulphates were a menace to the public health, and there was more or less outcry about polluted streams on that account. The researches of the United States Geological Survey have spoiled that bugaboo by showing that the substances mentioned acted as precipitants, clarifying the stream waters and removing disease-producing bacteria. The present outcry over culm damage seems due partly to the floods of last winter, but chiefly to a hostility to mining companies among local officials in towns where labor unions have a large following. Some local papers are editorially claiming that the rivers are being silted up by culm, so that the spring floods every year do more damage. We think, however, that it can be shown, without much trouble, that the amount of farming land belonging to private individuals that has been injured by culm is surprisingly small, that the obstructing of river channels by county and railway embankments and bridges is by far the more frequent cause of destructive floods, and that the natural erosion from the watersheds of the streams emptying into the Susquehanna during spring floods exceeds a thousand times the sediment contributed from culm dumps.

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THE PRODUCTION of anthracite coal since the close of the strike in 1902 has far exceeded that in any period of equal length since mining began in Pennsylvania. Shipments for 21 months ending July 31 amounted to some 106,700,000 tons, an average of slightly over 5,000,000 tons per month, although, previous to December, 1902, there were but five months in which shipments had exceeded 5,000,000 tons. Demand has naturally been less this year, as compared with the corresponding months of last year, and it is evident that the market will not absorb any such output as was taken last year. Hence, all the mining companies are now restricting production, hoping for heavier buying when cold weather starts the regular fall demand. It is worthy of note that the companies have adopted no uniform method of reducing tonnages; one company closing all its mines for a week, another some of its mines for a few days, and still another shutting down temporarily mines that are most expensive to operate, and running others part time.

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## THE PERSONAL EQUATION.

The repeated insistence in these columns of the importance to the mining industry of the sense of professional responsibility among the chiefs who direct the operations of mines, mills and smelters, will have failed utterly if it has not brought out the great underlying fact that personal character is the pilot who steers an undeviating course amid the shoals of pliant circumstance. Character means that a man will do the same thing under the same conditions; he is wanting in fixed individuality who modifies his action according to temper and environment. It is the one element which gives each man an identity among his fellows, making him an island in the sea of circumstance. Each is a law unto himself if he possesses character, but a concrete mob if he does not.

Given the same data, the conclusions formed by different engineers will vary, by reason of the introduction of that decisive element which represents the personality of the man who weighs them, balances them, and decides their relative bearing upon the work in hand. The personal equation is the application of character to practice. While the equation includes an unknown term, that term is supposed to have a fixed value; otherwise it makes a sum too difficult for the business of life which has no time for complexities. The expression of the personal equation is judgment, that indefinable quality of mind which enables a man to focus the experience of a lifetime upon the work in hand and give advice which by all the human probabilities represents the best solution of the problem set before him. In this effort training is a factor in selecting the experience which throws the best light on each separate case, and in establishing the logical bearing of various kinds of knowledge upon the special circumstances.

When two or more individuals co-operate, various personal equations of unlike terms are combined and the result can no longer be expressed definitely. Character is obliterated, a crystalline individual becomes an amorphous aggregate. You cannot syndicate character.

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## MINING CONCESSIONS IN THE YUKON.

Many of our readers will doubtless remember the excitement and opposition caused by the so-called "Treadgold Concession" made by the Canadian government in April, 1902. By this act the Ottawa authorities granted to Treadgold and his associates a large number of mining claims in the Yukon. It was charged at the time that this concession would result in throwing the gold placers of the newly opened territory into the hands of a few; that it would deprive other holders of their rights to water supply; and that it would virtually create a monopoly of those valuable concessions. Charges of fraud and irregularity in the grant were also freely made, and feeling ran so high that it is quite probable that actual violence would have followed any immediate attempt of the holders of the concession to put it into effect. So much feeling did the affair cause, and so strongly was the opposition pressed, that the government appointed a commission to enquire into all the circumstances connected with it. This commission, consisting of Judge Britton, a well-known lawyer, and Mr. B. T. A. Bell, secretary of the Canadian Mining Institute, visited the Yukon and took a great deal of evidence there and elsewhere. Unfortunately Mr. Bell died soon after returning from the Yukon, and before the report was completed. He had, however, heard all the evidence and had partially prepared his comments on it, so that the report, which has now been made by Judge Britton alone, undoubtedly bears the impress of Mr. Bell's work and opinions. He represented the mining interests, as Judge Britton did the legal side of the question.

It may be said that the immediate interest of the matter has passed, inasmuch as the grantees never carried out the terms required from them, and the concession was subsequently withdrawn. The report, however, is of interest as giving some opinion on the present and future possibilities of gold mining in the Yukon. We may mention, however, that it does not find the allegations of fraud supported by the evidence; nor does it find that the concession would have injured the other miners so far as water supply is concerned. In fact, Judge Britton is inclined to think that the concession—if it had gone into effect—would not have been a bad thing for the Yukon; but he does find that without some specific provision to safeguard the interests of the smaller miners, or without a change of public sentiment, there would have been considerable risk in endeavoring to carry its provisions into effect.

The present situation in the Yukon, and especially in reference to what is generally known as the Klondike district, Judge Britton finds to be dependent almost entirely upon the supply of water for mining purposes. Many claims have been but partially and superficially worked, owing to the absence of a proper supply of water; and in many cases the proper storage and distribution of water can only be secured by a considerable expenditure of money and by co-operative efforts, which can hardly be secured by the owners of small and scattered claims. The advances necessary for the construction of storage reservoirs, ditches and other necessary works, involve considerable risk and considerable capital, and persons mining claims on a small scale cannot be expected to undergo the one or to supply the other. Although the fact is not stated in so many words, the implication is that the future extension of mining in the North must depend very largely upon the operations of companies with sufficient capital to work on a large scale and to invest considerable amounts before receiving returns. This opinion coincides with that of many who have carefully considered the situation. The day of the poor man in the Yukon is passing away, and there, as in many other fields, the coming of the large operator cannot be postponed. This conclusion is assisted by the natural conditions of the country, including the high cost of bringing in machinery and supplies; the severity of the climate, and the short period of the year during which working is possible. The small miner must earn in 120 days enough to supply him for the balance of the year, and this alone is a handicap upon his operations, sufficient in many cases to prevent them altogether.

Regarding the richness of the region, there is no present doubt. Even the operations which have been carried on have been imperfect in their nature and the probability is that with proper machinery and appliances, most of the claims which have been worked up to date, could be re-worked at a profit. Judge Britton's opinion, based largely on the evidence taken, is that the prosperity of the Yukon and its importance as a gold producer is assured for many years, provided a sufficient supply of water can be obtained at a reasonable cost. The last is the important condition. Naturally the Yukon miners are anxious that the government should undertake works for the conservation and distribution of water. It does not, however, appear that the government is ready to do this, nor does it appear that there are substantial reasons why it should undertake a system of works which, after all, would inure ultimately to private profit. Any discussion of that phase of the question, however, would lead us into a wider field, and this is not the time or place to discuss the matter.

## GERMAN IRON PRODUCTION.

The reports of the German Iron & Steel Union show that in the first half of the current year there was only a moderate increase—1.3 per cent—in the output of the German blast furnaces, as compared with the first half of 1903. If comparison is made with the second half of last year, we find a slight decrease—83,956 tons, or 1.7 per cent. The figures for the first half of this year are given below in metric tons, the comparison being with the first half of 1903:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| Foundry iron | 833,763 | 898,890 I. | 15,127 |
| Forge iron | 450,956 | 411,436 D. | 39,520 |
| Steel pig | 376,738 | 293,813 D. | 82,925 |
| Bessemer pig | 209,704 | 220,873 I. | 11,169 |
| Thomas pig | 3,013,371 | 3,174,401 I. | 161,030 |
| Totals | 4,934,532 | 4,999,413 I. | 64,881 |

Under steel pig are included spiegeleisen, ferro-manganese, ferro-silicon and all similar alloys. Thomas, or basic, iron forms the greater part of the German output, being 61.1 per cent of the total in 1903, and 63.5 per cent this year. Forge iron has been declining for several years, under the competition of steel. Bessemer pig and foundry iron show small increases this year, but the chief gain was in basic iron.

The approximate consumption and disposition of this iron for the half year was as follows:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| Production | 4,934,532 | 4,999,413 I. | 64,881 |
| Imports, pig iron | 58,285 | 93,688 I. | 35,403 |
| " finished | 90,206 | 105,332 I. | 15,126 |
| Total supply | 5,083,023 | 5,198,433 I. | 115,410 |
| Exports, pig iron | 248,428 | 115,897 D. | 132,531 |
| " finished form | 1,898,847 | 1,560,004 D. | 338,843 |
| Total exports | 2,147,275 | 1,675,901 D. | 471,374 |
| Consumption | 2,935,748 | 3,522,532 I. | 586,784 |

In this statement allowances are made for losses in conversion into finished forms, so that the figures represent the quantity of pig iron required to make those forms as exported, or imported. The figures show that there was a total increase of 34.1 per cent in imports; a decrease of 21.9 per cent in exports; and an increase of 20 per cent in the approximate consumption. No allowance is made for stocks on hand, but it does not appear that there was any material change in these. The large decrease in exports was, in part, due to a cessation of demand from the United States.

## MARKET CONDITIONS.

Aug. 17.

The metal markets generally continue rather quiet. The vacation season is not yet ended, and the expected revival in business is still postponed. Nevertheless, the general feeling is one of confidence rather than of depression, and most people are looking for at least a fair business in the fall, even if they are not saying much about it.

In copper, while there is no material change in prices or conditions, domestic consumers seem to be taking rather more interest in the market, while foreign demand is improving, though very slightly.

In tin there is nothing new to report. Lead is also quiet, with no change in prices, but with a better consumptive demand. Spelter is unchanged, and rather more active. The Joplin ore market, however, keeps up at about the same level, and production is not improving at the mines.

Silver has been steady, upon the whole, with only moderate fluctuations in price. The market continues to be supported by steady demand from India, and shipments to the East continue on government orders.

In the iron and steel markets, Wall Street has originated a lot of talk about an impending steel war and lower prices, but all this seems to be based on a very insufficient supply of facts. The market generally continues dull, however, and the expected fall buying has not begun. Purchases, both of raw and finished material, are mainly for short deliveries, and buyers do not yet seem to be convinced that the turning point has been reached. It does not now seem probable that we shall have to record any material changes before the close of August. The only point in favor of an improvement is, that both southern and northern furnaces seem less inclined to make concessions on pig iron contracts than they were.

Late on August 17, the American Steel & Wire Co. issued a circular announcing a cut of $5 per ton in all wire products. It is said that this cut was the result of a hurried conference of Steel Corporation directors, and that it will be followed by cuts on other steel products. This, however, is still uncertain.

The western coal markets are rather depressed. Lake trade in July was heavy, but the total lake shipments up to August 1 are below those of last year. Local demand for manufacturing purposes is not pressing, and there is a good deal of competition for what trade is going.

The seaboard bituminous coal trade continues unchanged in condition, and there is little or nothing new to report.

The anthracite market is also quiet, both on the seaboard and in the West.

## METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

According to Mr. Dugald Clark, there have been produced in England, since the internal combustion engine was first made, nearly 100,000 gas and petroleum engines. At first, these were generally small, and it was only at a comparatively recent date that large engines of this type have been made. The average, however, Mr. Clark takes at 20 h.p., so that approximately 2,000,000-h.p. of such engines are in use in Great Britain.

Over 9,000 tons of raw alum, valued at about $33,000, were shipped to France from the port of Civita Vecchia in Italy last year. There were also shipped about 175 tons of sulphuric acid, which were sent to southern Italy and Sicily, for the manufacture of dynamite. The alum goes to Rouen, in France, where it is refined. It is said that the price of alum is so low that there is little or no profit in the business; moreover, the cost of transportation from the mines to the port is very high. For these reasons the trade has developed very slowly.

To produce pyrophoric alloys for igniting gases Welsbach, in his French patent, uses one or more of the rare earth metals—lanthanum, cerium, etc.—fused together with iron, 30 per cent of the latter giving the best results; nickel or cobalt may, however, be used, instead of the iron. Such an alloy, when rubbed with a file, emits brilliant sparks which are capable of igniting a mixture of air and gas.

The soda and magnesia lakes of Wyoming are estimated to cover an area of 1,028 acres. They are found in Albany and Carbon counties, and represent the beds of natural basins now mostly dry. The lakes containing sodium sulphate have an area of 708 acres, with an average depth of about 5 ft., which means a content of 4,900,000 tons of soda.

Fire-clay differs from ordinary clay in containing only a small percentage of alkalis and alkaline earths. It is a nearly pure hydrated silicate of aluminum, though usually admixed with more or less sand. It occurs frequently beneath coal seams, and in the bottom of peat bogs, where the solvent action of water has leached out the alkaline compounds originally present in the clay.

According to Dr. Michalis, when portland cement is mixed with water and hardens thereby there is unconditionally a re-arrangement of the molecules aside from, and as a consequence of the taking up of water. About one-third of the whole content of lime crystallizes out as lime hydrate. The crystalline separated lime, being less binding, has rather a tendency to destroy the preparatory cohesion of the cement mass. A portion of this lime hydrate remains permanently in that condition and is evidenced by the deposit under favorable conditions of an efflorescence on the surface of the concrete. When, however, slag is added to the cement, the soluble silica therein contained furnishes the chemical equivalent necessary to convert the whole of this lime hydrate into a lime hydro-silicate, thereby converting this element of weakness in the portland cement into an element of strength in the increased volume of cement produced by such addition.

## THE TREADGOLD CONCESSION IN THE YUKON.

(By Our Special Correspondent.)

The report of Judge Britton on the Treadgold and other mining concessions in the Yukon Territory was presented to the Dominion Parliament at Ottawa, August 1. It is a voluminous document and deals fully with the whole question of hydraulic mining in the Yukon. The report states that the local feeling was very strong not only against the Treadgold concessions, but against the principle of granting concessions of any kind. So pronounced was the feeling as to make an impartial inquiry somewhat difficult, owing to the natural reluctance of miners to give evidence against the wishes of a hostile majority. Much of the evidence was of a general and superficial character, not amounting to proof one way or the other in reference to the Treadgold concession. The allegations as regards other concessions having been obtained by fraud or misrepresentation he finds unsustained by evidence. In several cases, however, the conditions of the leases have not been complied with.

Regarding the Treadgold concession, the report says that from the evidence presented and looking at the matter from every aspect, he does not think the Treadgold proposition, even with all the objections to it, would be a bad thing for the Yukon if carried out on the lines indicated by Treadgold, but without a change in the particulars mentioned, or a change in public sentiment, there might be no little risk in attempting to install the system.

The report finds a unanimity of opinion regarding the necessity for a water supply for mining purposes, and that many of the objections to the Treadgold concession were based on the misapprehension that the interests of the miners were not safeguarded. The report goes on to state that it was made abundantly clear that only such claims as enjoyed water facilities had been properly worked; that owing to the difficulty of obtaining water successful mining has been seriously retarded and in many cases made impossible; that great expense will be required in the storage and distribution of water, and that the extent and value of the gold deposits in the trenches, banks and elevated grounds must remain unknown until water is made available by the construction of hydraulic works. Parties making advances for the construction of such works must necessarily take great risks with respect to their investments. A plentiful supply of water distributed for use in washing gold from gravel and dirt, on such terms as miners can pay, is the great need of the Yukon Territory.

In many places the rich pay-streaks have been worked out as far as this can be done by former methods, but if water can be supplied in sufficient quantity, and at low enough prices, it will pay to work them over again. The future of the Klondike section depends, not so much upon rich finds by a few, as on working large quantities of gravel in all the methods of sluicing and what is generally called hydraulicking.

The report takes up the features of the Treadgold concession as granted on April 17, 1902, in detail and finds the objection that the syndicate was granted a monopoly of the water of the Klondike river and Rock creek to be unfounded, and that there was no interference with the rights of miners or dam owners. In view of the fact that the order was rescinded in June last and that others are said to be ready to put in a water supply, Judge Britton states that the majority are favorably inclined to the government undertaking the work. Without expressing any opinion as to government ownership, it would be in the public interest for the government to get plans and specifications and obtain estimates of the cost. If a company is to do the work, the contract should provide a definite time limit for commencing and finishing, an obligation to sell within the district, a board to supervise rates. The rights of miners should be preserved in every particular with compensation for buildings, etc., moved or injured. After referring to some disadvantageous conditions, including the great expense of importing machinery and supplies, and the shortness of the season, which only lasts about 120 days of the year, Judge Britton goes on to say, "But with all its disadvantages, I venture to say that with its 450,000,000 cubic yards of gravel-bearing gold all within the small area of the district of Bonanza and Hunker creeks and their tributaries as estimated by Mr. McConnell, to say nothing of the remainder of the territory, if water can be supplied at a reasonable price, the prosperity of the Yukon is for many years assured."

The report concludes with the recommendation that placer work should not be accepted from those holding hydraulic leases in lieu of hydraulic operations. Placer mining operations might be adopted for the first year, or two years at most, as prospect work and to secure a dump pending water supply, but it should be promptly followed by work of the character and extent contemplated by the lease. Of hydraulic leases 40 have been granted since the Yukon was opened, of which 13 have been canceled; and of the 27 remaining in force 8 have been attacked—as obtained by misrepresentation, or for non-fulfilment of conditions.

## MINERAL PRODUCTION OF SPAIN.

The following statistics relating to the mineral production of Spain in 1903 have been taken from the report recently issued by the Bureau of Mine Inspection. The figures cover the leading minerals and metals, excepting coal and iron, which have already been reported in this Journal. The quantities are in metric tons when not otherwise specified:

| | 1902. | 1903. | Changes. |
|---|---|---|---|
| Antimony ore | 67 | 42 D. | 25 |
| Arsenic, white | *Nil.* | 1,088 I. | 1,088 |
| Asphalt | 6,034 | 4,675 D. | 1,359 |
| Barite | 642 | 507 D. | 135 |
| Cement, hydraulic | 201,856 | 245,294 I. | 43,438 |
| Copper | 36,045 | 27,448 D. | 8,597 |
| Copper ore | 2,618,654 | 2,799,789 I. | 181,135 |
| Fluorspar | 93 | 4,000 I. | 3,907 |
| Gold, kg. | 14.2 | 8.1 D. | 6.1 |
| Kaolin | 3,412 | 2,578 D. | 834 |
| Lead | 103,190 | 118,422 I. | 15,232 |
| Lead, Argentiferous | 74,370 | 56,687 D. | 17,683 |
| Magnesite | 100 | 2,260 I. | 1,160 |
| Manganese | 46,069 | 26,299 D. | 19,770 |
| Pyrite | 145,173 | 155,739 I. | 10,566 |
| Quicksilver | 1,425 | 968 D. | 457 |
| Salt | 426,427 | 427,368 I. | 941 |
| Silver, kg | 96,975 | 112,978 I. | 16,003 |
| Sulphur | 450 | 1,680 I. | 230 |
| Tin ore | 12,762 | 330 D. | 12,432 |
| Topaz, kg. | *Nil.* | 90 I. | 90 |
| Vanadium ore | 40 | 181 I. | 141 |
| Zinc | 5,569 | 5,134 D. | 435 |

It will be observed that with few exceptions there were no important changes in the returns as compared with the previous year. The output of quicksilver, however, showed a marked falling off owing to the decreased yield of the Almaden mines. The production of lead remained nearly stationary, the smaller output of argentiferous lead being almost counterbalanced by the increase in ordinary lead. Copper showed a falling off, although the output of ore was somewhat larger than in 1902.

# DISCUSSION.

**Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the columns of the ENGINEERING AND MINING JOURNAL.**

### ORE RESERVES AND TREATMENT CAPACITY.

*To the Editor:*

Sir.—I may be pardoned for returning to the charge, as the matter has proved of some interest.

In the JOURNAL of April 21, Mr. Lawrence seems to object to the use of the word 'amortization,' and before his onslaught I hasten to entrench myself behind precedent. My assistant, at my request, has scanned the pages of two well-known standard works on mining, and finds that the word 'amortization' appears in those pages no less than 162 times. As to the exact meaning of the word, "Investor," in your issue of June 2, has truly explained the origin of the word and its most proper use. I do not wish, however, to be taken as claiming amortization as a common feature of mining finance. Amortization, as used here, is a factor necessary to consider in financial calculations, yet it is a thing not often actually set out of dividends. In other words, the recovery of capital from a wasting enterprise within a given period is a necessary factor in the calculation of the pros and cons of that enterprise. Having served for the purpose of calculation, it is quite immaterial whether the $2 received from this enterprise should be separated and each stamped individually—one as amortization and the other as dividend, or not.

In the JOURNAL of March 31, Mr. Spilsbury says: "In the first place, from my own experience, I can safely say that the ore-treatment plant, whether milling, concentrating, smelting, or other reduction means, of over 75 per cent of the mines I have known, is from initial erection well in excess of the output of the mine under all ordinary conditions of development." I sympathize most deeply with Mr. Spilsbury that in 75 per cent of his experience and practice his lot has been cast among mismanaged mines. I carefully excluded this class in founding my argument, and I cannot accept the above statement as any refutation of my generalization. Mr. Spilsbury gives an example of a mine which, I observe, has the following characteristics:

1. Under ordinary conditions of development, it returns a fair profit and "an amortization fund of 5 per cent."

2. With mine development of a vigor which I propose, I observe that the hauling engine will not handle the waste dirt, and that the profits will all be eaten up by doing this increased development.

3. I observe that, given this development done, the mine is not likely, with its primary plant, to earn enough profit to build the secondary plant.

4. Supposing that the secondary plant be built, the profit derived from the combined plants will possibly be less than it would from the primary plant.

The case seems to me absolutely hopeless. I must again extend my sympathy to Mr. Spilsbury in having a mine of such truly wretched character, in that the margin of profit is too narrow to stand such a campaign, and that dispersion of the ore-bodies seems so great, and the waste dirt is of such enormous proportions, that neither the excavations for ore give room enough to stow it away, nor is the hauling engine good enough to cope with it. It is a most trying case, and I feel like admitting at once that this instance is like those emanations of the human brain called nightmares, entirely out of the reach of sound logic. My heart especially goes out to Mr. Spilsbury when I notice that in this particular instance an amortization fund of 5 per cent is considered sufficient, and therefore that the life of this wretched mine is bound to be at least 16 years. If Mr. Spilsbury, however, will give us the figures as to the size of the ore-bodies, the distance between them, the profit per ton, the total working costs and the fixed charges, I will agree to try to make my plan fit or show that hopes of amortization before death should be abandoned.

For Mr. Ingalls' letter in the JOURNAL of May 5, and Mr. Brown's letter in that of May 26, I have to thank both Mr. Ingalls and Mr. Brown for the kindly trouble they have taken to understand the points which I desired to make clear and the support they have given. I bow to Mr. Ingalls' suggestion that in such metal mines as have a product of variable price the question may, in certain conditions, be very much modified. Mr. Brown has prepared a useful table, which I trust Mr. Spilsbury will avail himself of, as it very much simplifies the application of the matter and might assist him in his troublous practice.

As to Mr. Brown's suggestion of the temptation of superintendents to treat rock rendered profitable by the lowering costs, due to increased equipment, and thus lowering the average profit of the mine, so as to even lower the total profit and to upset the calculations on which the extended plant was authorized, I believe Mr. Brown should carry his argument somewhat further—although, aside from the immediate question, I might observe that superintendents should not yield to the temptation to do wrong. If there exists in a mine such an amount of ore of a lower grade which can be profitably worked by a reduction of costs to be secured by larger equipment, as will affect the total output, then this ore forms a problem by itself, entirely aside from the ore which was within the scope of the primary plant. Either this secondary ore warrants an increase in equipment to work it, upon its merits alone, or it does not. If it does so warrant, and the primary ore also warrants an extension of plant for reasons set out in my programme, then there should be two extensions of the plant and not one.

In your issue of April 21, you, in effect, say that the unashamed and essential American idea is that it is poor business to mine for posterity, and I assume from the context that you offer this as a criticism on my plan. The proposal I have laid down will, if followed, exhaust a mine far more quickly than is common in American practice. It is my belief that it is possible to extend the development in the average mine by the depth to which the shaft can be sunk, say 350 to 450 ft. per annum, and if my plan were followed, mines would be exhausted with this rapidity. Instead of most of the American mines being more than 10 years old and few of them excavated to a depth of 1,500 ft., they would, had my plan been followed, been excavated to a depth of over 3,000 ft.; in fact, among the most serious objections which I see to the proposal which I have made, is not that it works the mines too slowly, but that it works them too fast. It has been suggested to me that from the broad standpoint of public good it will exhaust the mines too rapidly. As Mr. Ingalls points out in—say, copper mines—this programme would flood the market with metal.

In your issue of April 21 you raise the question of the occasional desire on the part of a mine-owner to devote himself to development work with a view to increasing his ore-reserves and profit in sight to a figure desirable from the standpoint of sale of the mine. This, of course, is a matter of policy entirely out of the discussion of a method to get the greatest ultimate profit on the ore itself—this involves the great science of getting the most money out of some other human being.

In your issue of June 23, Mr. Bancroft raises an important subject in a discussion of the care and nurture of infant mines. I wholly agree that the problems which surround the installation of the primary plant may often be far different from those of the secondary plant. Mr. Bancroft's article I must point out to one critic as my justification for stating the case in the manner in which I did—that the real problem of ratio lies for its solution in expansion, not in original installation.

If I were going to generalize on the subject of primary plants I should probably fall back upon the principle of a friend whose occupation is the operation of mines through their nursery stages; that is, "In common business prudence do not erect a treatment plant at all until there is enough profit in sight to repay the cost of it."

H. C. HOOVER.

Johannesburg, July 15, 1904.

### PYRITE SMELTING.

*The Editor:*

Sir.—Dr. Peters, in his review of pyrite smelting in your issue of July 21 leaves the question of the behavior or rôle of zinc and alumina in the slag undecided. In so doing he avoids a controversy which has prevailed among metallurgists in the past, and especially as regards the action of alumina. Many, especially those engaged in iron smelting, have held that alumina is to be regarded as an acid element acting much in the same way as silica. But for those who are engaged in pyrite smelting, where lower temperatures and irony slags are used, the conditions are very different from those of the iron blast furnace. The conditions of the silver-lead treatment of miscellaneous ores are, in many respects, similar to those prevailing in pyrite smelting, with the difference that any departure from a type slag in silver-lead smelting is accompanied by unsatisfactory working and metallurgical losses. Such slags have, therefore, been closely studied. Indeed, much of the success of those engaged in pyrite smelting has been due to the fact that men engaged in it have also operated silver-lead blast furnaces. Indeed, it may be personally asserted that those who have not followed the latter practice are at a disadvantage compared with those who have, because they have not been compelled to study slag composition so closely.

The behavior of zinc and alumina in a slag is such as to obscure the mutual action of its acidic and basic elements, and we are finding to-day a portion of our metallurgists adopting a very different way of looking at these relations, which has resulted in their using a working hypothesis, at least capable of satisfying the varying conditions of their practice. This consists in looking upon both zinc and alumina, not as bases, but as elements singly dissolved in the molten magna; that is, they are non-effective bases, which, as their relative proportion increases, singly stiffen the slag much as

sand stiffens mortar. Under this view the variables to be estimated and allowed for are, for the acid constituent, silica, and for the bases, the alkaline earths, iron and manganese. Under this hypothesis, zinc, whether as sulphide or as oxide, stiffens the slag, and where the quantity of slag is increased by the use of a larger proportion of silicious ores, the slag runs smoother. This, of course, is the same as diminishing the percentage of zinc in the slag. Alumina is to be regarded as acting in the same way, and should have like treatment.

To illustrate the manner of estimating the fluxes needed in making a slag of a given type, we will take the case of two slags, known as three-quarter slags; that is, slags in which the ratio of lime to ferrous oxide is, as three to four. We have:

| | 1. | 2. |
|---|---|---|
| $SiO_2$ | 35.4 | 30.8 |
| FeO (MnO) | 31.8 | 27.7 |
| CaO (MgO, BaO) | 24.7 | 21.5 |
| $Al_2O_3$, ZnO, ZnS, $K_2O$, $Na_2O$ | 8.1 | 20.0 |
| | 100.0 | 100.0 |

In the first instance (1) the alumina and zinc are small relatively to the active bases, while in the second (2) the percentage is large. The ratios of silica to the active bases, it will be observed, remain the same. In the second case (2) the zinc and alumina become too much to be capable of being dissolved in so small an amount of accompanying silicates, and hence the reason why I have, in a former article on pyrite smelting, limited the zinc to 10 per cent of the slag for easy running. However, while the proportions given are ideal for obtaining lead-free slags, when it comes to the question of fusibility only, the ferrous iron may be advantageously increased and the lime decreased from the proportions just given. What I wish particularly to bring out is that, in our working hypothesis, neither zinc nor alumina is to be reckoned as an active base, nor is the latter as acidic in its action. When an aluminous slag has a so-called acid appearance, it is due, not to the alumina acting as an acid, but because it is a solute which has made the molten mass more viscous.

The preceding observations apply to type slags which do not exceed 36 per cent silica. When we come to the acid slags, other conditions prevail. Since any given element in a slag seeks to combine with other elements in proportion to its needs, it follows that the large proportion of silica present is eager to regard alumina as a base, and it no doubt does so. How otherwise can we account for the fusibility of the viscous high-silica slags, sometimes reaching 65 per cent silica? Such slags have a corrosive effect upon basic or even on neutral linings, and where lead is present are cleaned from it with great difficulties.

L. S. Austin.

Houghton, Mich., Aug. 8, 1904.

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GAS IN METAL MINES.

*The Editor:*

Sir.—I notice in the current issue of the Journal a letter from Mr. H. Vincent Wallace, describing an explosion from inflammable gas encountered in a metal mine, and resulting in the death of an employee. Three weeks ago we had an explosion in the mine, of which I am in charge here, under exactly similar conditions to that described by Mr. Wallace. I fancy the occurrence of fire-damp, of which marsh-gas ($CH_4$) is the main constituent, is not so uncommon in metal mines as is generally supposed.

The late Sir Clement Le Neve Foster, in his book on 'Ore and Stone Mining,' gives numerous instances of fatal explosions due to fire-damp. Moreover, it is certain that old workings and rotting timbers are by no means necessary for its production; instances are given by the same author of its having been met with and causing an explosion on first cutting the vein in a new mine.

The explosion that occurred here cannot have been due to rotting timber, as the old workings in which the gas was found are in hard ground, and there are no signs of timber having been used. Personally, I know of two other instances of fire-damp occurring in metal mines, though in both cases in old workings where timber had been used.

Hedley D. Crowder.

El Oro, Mexico, Aug. 5, 1904.

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AMENDMENT OF THE MINING LAWS.

*The Editor:*

Sir—I am delighted to see, by your issue of June 16, that at last the Mineral Land Law is to receive attention. Regarding the first of the topics suggested by Dr. Raymond, it would seem that all persons interested in mining should agree, excepting a few mercenary lawyers and blackmailers. But I fear that a large portion of that most useful class, the prospectors, will be found in opposition and fail to appreciate what an advantage to them will be the removal of the cause of so much litigation, and the consequent increased attractiveness of mining investments to the conservative. They consider the extra-lateral privilege as a rightful reward to the discoverer of a lode. They believe that it is often impossible to determine, before filing a location notice, the dip of a vein with sufficient accuracy to lay out the claim so as to include beneath it the maximum possible portion of the vein. To be sure, an amended location is possible—provided some one has not stepped in ahead—but this tends to confusion of the records. I would suggest that the objection raised by the prospectors may be met in either of three ways:

1—The adoption of the claim, as in British Columbia, 1,500 ft. square, allowing an area sufficient to cover the vein on its dip to a probably satisfactory extent, regardless of any vagaries it may develop unexpectedly.

2—A plan like that of Mexico, by which a concession is granted permitting to a single individual or corporation the exclusive right to explore and take up claims during a limited period in a certain area.

3—A plan somewhat resembling the second, which, I believe, has at some time been a custom in one at least of our Western States, according to which the prospector posts a notice of "Intention to Locate" and states in general terms the direction of his claim, following which, within 90 days, he determines the strike and dip of his ledge, stakes his claim accordingly, and files his notice of location.

The first of these plans is open to the objection that in a region where there are a large number of veins near together, as in the vicinity of Central City, Colorado, the great area granted ties up much valuable ground, which would otherwise probably be more rapidly and thoroughly exploited. In fact, it may be, if in the hands of a weak company, tied up indefinitely.

The second plan, while probably well adapted to our moderate southern neighbors, is not likely to find favor in the minds of those who wish to be "in" on the rush which always attends the announcement of a new Cripple Creek. Nor is it suited to the methods of the prospector, who starts out early in the season with his burro, having but a vague idea of the field to be covered, and who travels hundreds of miles before finding anything which appears to him worth locating.

The third method seems to me the most satisfactory way of meeting the objection of the prospector to the loss of the extra-lateral right. When he has found a vein, give him 90 days in which to determine by exploration how to lay out his claim, so as to cover the greatest possible extent of the vein on its dip and strike. Then stick to the old size of 600 by 1,500 ft., but remove the present clause requiring 300 ft. on each side of the outcrop (center line) and allow him to place his 600 ft. as he pleases. Of course this will be largely on the hanging-wall side of his outcrop.

As a result of the abolition of the extra-lateral right the law requiring the finding of ore "in place" (usually more specifically stated in the State laws), before making the location must be dropped, as the ground beneath which a vein dips must obviously be locatable, even though there is no mineral on the surface. This law has always been a farce anyway. How often, in looking at the prospectus of some stock-selling company, have we commented on the kindness of Nature in placing veins just 600 ft. apart so that parallel adjoining claims may be exactly the maximum width allowed by law.

The second topic suggested by Dr. Raymond has particularly attracted my attention on account of conditions in the place where I happened to first see his article. I refer to the question, "Is there any good reason why the United States mineral lands should not be surveyed and mapped . . . and why locators should not initiate their title by due notice to the owner of the land?" I certainly would not reply in the negative. Yet the article comes to hand at a point very suggestive of the difficulty of carrying this out for some time. The Alexander archipelago is made up of thousands of islands, varying from less than one mile to several hundred miles in extent. To even the Coast and Geodetic Survey some of these islands are so little known that a bay two miles long is not shown, and I am told that the charts used by mariners are largely compiled from Russian sources and notes made by Vancouver over one hundred years ago. To the United States Land Office these lands are an enigma, and it must be very many years before they can be surveyed and locations made to conform with, or tie to, the section and township lines.

Perhaps I am wrong in bringing up Alaska, even southeastern Alaska, as an example of the difficulty, but there are large areas of several of our western States still unsurveyed, and so difficult of access that at best the work must be slow in completion. Where they are surveyed I must admit that personally it has not always been an easy task to find established corners. Now the prospector is our scout; it is from his work that our mines develop. What chance has he in a country unknown to him to lay out his lines in conformity with section lines, or to tie to corners which apparently do not exist? Let us not hamper him any more than is necessary, in order that we may have a definite knowledge that the ground is taken up. By a recent law, actual monuments on the ground rule in determining location of patented

claims. Then why not require the prospector to establish monuments, as in Mexico, so that from any one monument the preceding as well as the following one may easily be seen. And let us have the real thing, not like one I found in Oregon recently, less than 1 ft. high and less than 1 in. in diameter. Of course that was illegal, but customs rule in small camps (Amen to Dr. Raymond's third suggestion), and this was recognized. It is a pleasure to hunt the bounds of a Mexican location, with large stone mounds, often painted a distinguishing color.

How often, except in such a camp as Butte, does any one go to the records to determine whether ground is open to location? The first thing is to see the ground and find out whether it promises value. If it does, how much better to be able to determine on the ground whether it is locatable than at some land office a hundred miles away. It is at least possible by requiring proper monuments to determine on the ground whether it has ever been located, and it would seem that American genius might invent a method by which substantial records could be made on the ground, showing date of location and when the annual assessment work is done.

Far be it from me to discourage the surveying and mapping of our mineral lands, and, when this has been done, notification to the proper land office of the location of claims taken up, with the corresponding notification of their abandonment (can it ever be?) so as to keep the records straight. But first let us get rid of "the extra-lateral right which underlies 99.9 per cent of the mining litigation." Can we not insist on this so forcedly that it may not, as is suggested, await the delayed final report, but be acted upon immediately? At all events, let us not delay the 99.9 per cent by causing the Commission to withhold all recommendations while we discuss the pros and cons of our minor troubles.

GEORGE A. PACKARD.

Coronation Island, Southeastern Alaska, July 18, 1904.

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*The Editor:*

Sir.—The letter of Mr. Tays in the current JOURNAL is interesting, but it seems to me to propose amendment of the mining laws along the wrong lines.

First, square or approximately square mining claims seem to me to be of the wrong shape; since it is seldom that the distribution of values is such as to make these desirable. So far as the shape of our present claims is concerned, it seems to me to approach more nearly the desired condition. I think we all agree that vertical planes should bound the claims; but I am not prepared to agree that present claims, where the right to follow the vein has not been exercised, are necessarily entitled to proceed under the present laws and follow the vein, if Congress should provide some other rule. At least, claims which are not patented would not be so entitled. It seems clear that Congress could, as to these inchoate rights, deal with them as it would.

Our people do not like the idea of the government reserving rights. There would be small market for agricultural lands if they were to be torn up at the will of every prospector who might think there was a chance of finding values. The idea of paying annual taxes to keep a patented claim alive startles our notions of ownership, and I believe that most mining men will object to it.

The proposed scheme of administration is but little simpler than the present one. These plans cannot be made so simple as one would imagine, because, unfortunately, there is a certain amount of corruption and rascality in every business, for which the innocent must suffer. It seems that the annual tax business would afford as nice a chance for blackmail as one would wish. The idea of having department circulars fix the law is startling, and shows a lack of acquaintance with our constitutional methods.

Certainly, Mr. Tays must have fallen in with a singular kind of lawyers, to class them with blackmailers as he does in his second paragraph. It may interest him to know that lawyers, of all others, are the ones who strive to bring imperfections of the law to test, and to remove them as far as possible. As an example, the American Bar Association has for many years had a 'Committee on the Uniformity of the Laws,' which has procured the enactment by 32 States of a uniform law of bills and notes, besides much other work which I will not specify; and it is now considering drafts of acts on other subjects, commercial and domestic, with the idea of getting the laws of all of our States, on the more important topics, into as nearly as possible a uniform condition. No one but a shyster would foment litigation. Although the biggest scamp I ever knew was a mining engineer—and the next biggest a lawyer—I do not class mining engineers with blackmailers. Let this discussion be conducted with good temper or not at all. It seems very unnecessary to cast slurs upon any of the profession who wish to have the law improved.

T. J. JOHNSTON.

New York, Aug. 12, 1904.

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## TIN MINING IN THE STRAITS SETTLEMENTS.*

BY W. T. SAUNDERS.

The Straits Settlements furnish about 60 per cent of the world's supply of tin. Most of this output is obtained from alluvial deposits, which are of great extent, particularly on the western side of the peninsula. Large deposits of alluvial tin are known to exist also on the western side. In the State of Pahang several areas have recently been leased from the government for the purpose of working. Lode mining is confined chiefly to the eastern side, where the Pahang, the Pahang Kabang, the Royal Johore and the Bundy companies are in operation.

The mines owned by the Pahang Corporation and the Pahang Kabang, which are the largest on the peninsula, are situated about 40 miles up the river Kwantan, from the port of the same name. Transport is maintained by steamer from Singapore to the port of Kwantan, a distance of about 225 miles, and thence to the mines by small boats worked by Malays. The freight from Singapore to Kwantan costs about $3.35 per ton and boatage thence to the mines about $4.10 per ton.

The principal workings of the Pahang Corporation are confined at present to four lodes which are worked from a vertical shaft that has been sunk to a depth of about 350 feet below adit level. Other lodes have been developed, and on one there is a vertical shaft 520 feet deep now out of commission. The concession of the corporation comprises an area of about 500 square miles and is leased from the Colonial Government at a royalty of 5 per cent on the tin worked.

The principal mines of the Pahang Kabang Company are on what is known as Fraser's lode. The ore is being extracted at present from above adit level, and a shaft will be sunk for deep development. The formation at this, as well as the other mines, is slate, the tin-bearing lodes intersecting the country in an east-and-west direction. The lodes vary greatly in thickness, and for the most part are not defined by any distinct walls.

The stone from the mines of both companies is crushed in the same mill. The mill comprises a stamp-battery of 60 heads, together with Vanner tables, buddles, grinding pans, furnaces, etc. The quantity crushed averages about 3,500 tons per month. On an average the stone taken from the mines of the Pahang Corporation carries from 2 to 2.75 per cent of black tin, which assays 71 to 72 per cent of metal.

The labor employed in the mines is practically all Chinese. The native Malay, with very few exceptions, is absolutely useless for any work other than boating and procuring timber suitable for mining and structural purposes. The cost and difficulty of procuring timber are great handicaps to the development of the mines. The Chinese are procured from agents in Singapore at a cost of $25 or $30 per man, and are brought to the mines under an agreement to work 300 days. In compliance with the agreement they are supplied with food and clothes and sufficient money to purchase tobacco or opium. Whenever practicable the work is let by contract. The contractors engage their own gangs and purchase their own tools and explosives from the companies' stores. The contract price of driving levels is from $20 to $35 per fathom.

The working costs at the mines fluctuate considerably owing to the varying rate of exchange of the currency. Taking the Straits dollar at 42c., the cost per ton of crushed stone is about as follows: Development, $0.84; mining, $1.68; dressing, $0.96; general expenses, including royalties, office and other items, $1.68; total, $5.16 per ton.

The cost of producing black tin as sent to the smelter ranges from $225 to $300 per ton. The product from the mines is shipped to Singapore for smelting into metal. The Straits Trading Company is the largest smelter and handles nearly the entire output of the mines in the country, producing over 100 tons of ingot tin per day.

*Abstract of a paper read before the Institution of Mining Engineers.

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BEHAVIOR OF ZINC IN THE IRON BLAST FURNACE.—Many iron ores in Virginia contain 0.1 to 0.6 per cent zinc, which causes considerable trouble in the furnace operation by forming deposits consisting chiefly of zinc oxide. These deposits form just above the stock line, in the downcomer, flues, and hot blast stoves. The furnace lining also absorbs zinc, in largest amount at zone. These phenomena were described by S. Porter in the *Iron Age*, March 24, 1904. In six months a furnace used 28,746 tons of ore containing 202.8 tons of zinc, of which the following was accounted for: In flue deposits, 36.5 tons; in downcomer deposits, 18.2; in furnace deposits, 16.6; in flue dust, 18.3; in dust-catcher dust, 16.0; absorbed in hearth lining elsewhere, 10.0; lost in gas wasted at top, 18.6; total, 141.3; unaccounted for is represented by dust in stoves, boilers, chimneys, and carried away in chimney gases. In no case did the slag assay higher than 0.05 per cent zinc.

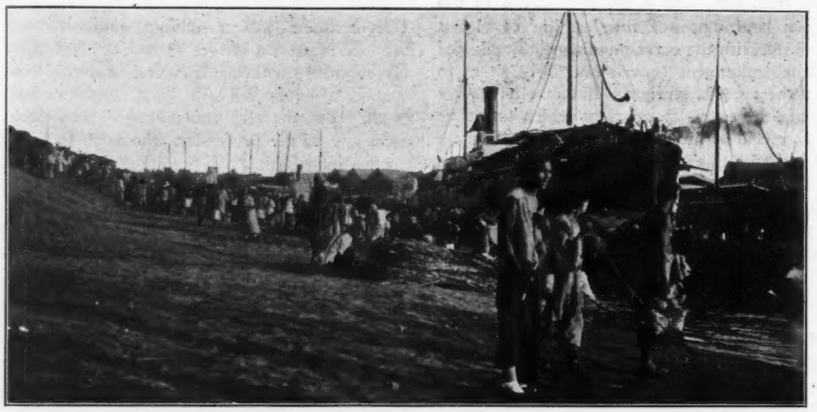
## SHIPPING CHINAMEN TO SOUTH AFRICA.

By An Occasional Correspondent.

The recruiting and shipping of Chinese coolies for the South African mines has actively begun in Hong Kong and in Tientsin. The first shipment, consisting of 1,100 coolies, left Hong Kong on May 14, and the second shipment, comprising 1,971 coolies, left Tientsin on June 27. The third shipment left Tientsin on July 2 and consisted of 2,000 coolies. It is not improbable that the recruiting of coolies will eventually be limited to Northern China, as the men are better adapted to the climatic conditions of the Transvaal, are better men physically than the Southern Chinese, and are much more easily controlled than the Hong Kong and Cantonese coolies. Again, the northern country is free from plague and promises to continue so, and finally the northern coolies can be obtained in practically unlimited numbers.

COOLIES PREPARING FOR EXAMINATION.

The recruiting is being conducted by European firms located in the Chinese treaty ports, each firm entering into a contract with the Transvaal representatives to deliver specified numbers of coolies aboard ship within a specified time. The firm then assembles the coolies at the treaty port and the formalities of entering into a contract with each laborer are carried out. In Tientsin these formalities are conducted in a high mat shed erected in the recruiting enclosure, which is on the bank of the Pei-Ho River, on which the coolies are shipped on coasting steamers or lighters to the large transports which lie outside of the river bar at Taku, distant from Tientsin about 28 miles. The coolies are admitted to a large room in the mat shed in lots of 100, and after the contract has been read and explained to them, they are numbered and passed one at a time to the medical officers. About 30 per cent are rejected for being physically unfit or for being under or over the age limits, which have been placed at from 20 to 40 years. Those accepted by the medical officers are given a medical certificate, with the coolie's number. They now pass to the contract room, where they sign the contract in the presence of a Chinese official appointed by the Viceroy of the Province, and the representative of the Transvaal government. In an adjoining room the coolie can give up any luggage to be sent in the ship's hold, for which he is given a receipt. The coolies next pass into a large bathroom, where their old clothing is taken away from them and, after an antiseptic bath, they are given a new and substantial suit of clothes. In the next room they receive an advance of $30 (Mexican dollars), which is to be deducted in installments from their wages, and they also receive a parcel containing their bedding, winter clothes, wash-basin and other necessities. From here the coolies pass into a room where they take leave of their friends and relatives and in most cases they leave a large portion of their advance wages with their families. They then pass into an assembly room, from which they go aboard the steamer or lighter which conveys them to the transport.



COASTING STEAMER LEAVING TIENTSIN WITH COOLIES.

The transports are large and roomy and fitted with every convenience for the accommodation of the coolies. Each carries a surgeon, with ample medical stores, as well as large quantities of food and water, and the ships are carefully inspected by the port authorities before being cleared, especial care being taken to see that each coolie has received his passport from the Viceroy's representative. The Transvaal authorities are engaging a number of Europeans who are acquainted with the Chinese language and customs to assist the mine managers in the handling of coolie labor, and to act as compound foremen on the mines.

COOLIES GOING ABOARD STEAMER AT TIENTSIN.

All questions in connection with the recruiting of Chinese coolies for British colonies have been adjusted satisfactorily between the British Minister at Peking and the Chinese Board for Foreign Affairs so that in place of opposition from the Chinese government, as had been predicted, every assistance has been rendered by the Chinese authorities, who consider the enterprise a good opportunity for the laboring classes of China. The coolies also are anxious to avail themselves of the opportunity, and when rejected by the medical officers are extremely dejected.

A summary of the labor contract has already been published in the Journal.

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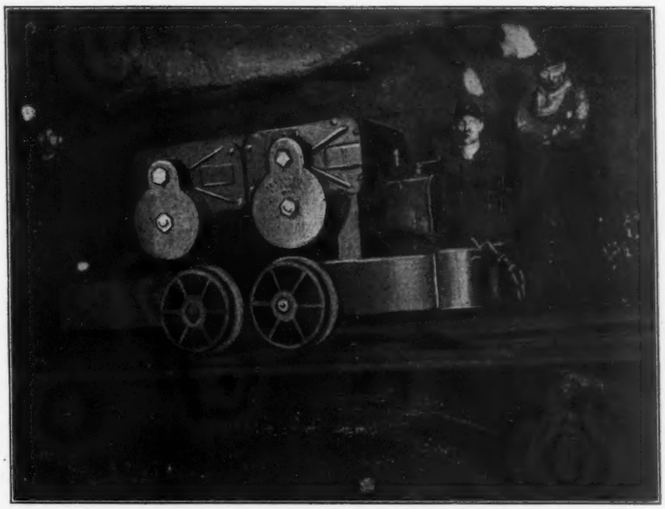
Loess is a fine calcareous silt or clay, of yellowish color, which is thought to have been formed by the action of wind. It occurs over a part of the Mississippi valley, in Central Europe and in China, attaining its greatest development in that country in the basin of the Hoang-ho, where it reaches a thickness of hundreds of feet.

## THE EHRENFELD COLLIERY.

EDITORIAL CORRESPONDENCE.

The Pennsylvania Coal & Coke Company is working two seams of coal at its group of four mines at Ehrenfeld on the main line of the Pennsylvania Railroad, 10 miles east of Johnstown. The mines were opened and were owned by the Webster Coal & Coke Company, which still maintains a separate corporate existence, though details of operation, sales, etc., are under the supervision of the Pennsylvania Coal & Coke Company, which now controls some 110,000 acres of coal land tributary to the Pennsylvania and the New York Central railroads.



MORGAN THIRD-RAIL ELECTRIC LOCOMOTIVE.

The seams worked are the B, or Lower Kittanning, and the E, or Upper Freeport, separated by about 180 ft. of shales and sandstones. The former is of chief importance, and on it most development has been done. The output of the Ehrenfeld mines in 1902 was 404,272 tons, but the mines are young, and the intention is to bring the output up to 1,000,000 tons or over, yearly, the tipple being planned for an output of 4,000 tons daily.

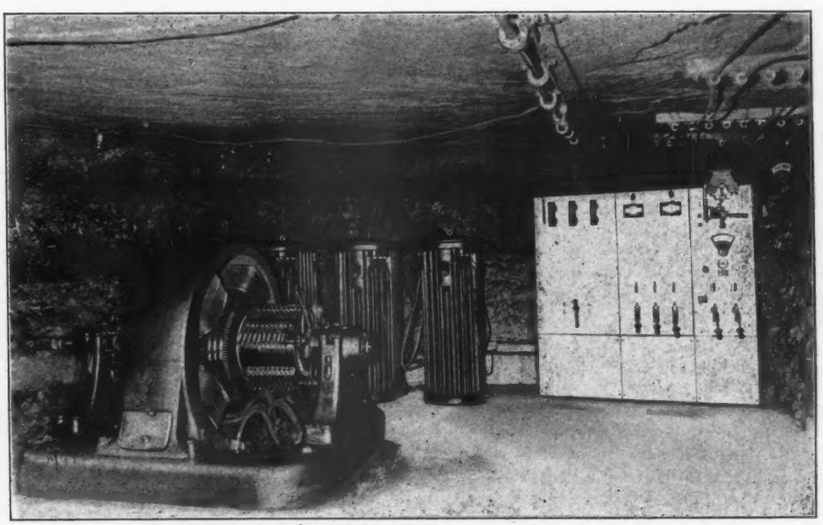
*Tipple.*—The tipple is of wood on concrete foundations, the main timbers being 10 by 12 in. hemlock. It has two floors and spans four railway tracks. On the upper floor are four cross-over Phillips dumps (three for coal and one for rock) and 14-ft. Fairbanks scales. The coal from the Miller and Lemon seams is kept separate. The mine-run from each seam is dumped over a 10-ft. bar screen with 2-in. openings; what passes over this screen is classed as lump and falls on a picking band 5 ft. wide and about 55 ft. long, between centers of sprocket wheels, that delivers to railroad cars. The slack is separated by a steel-plate screen with 0.5 by 1.5-in. openings, the slack being pushed to chutes over the railroad cars by two Caldwell screw conveyors. Provision is made for delivering mine-run to the picking belt, the lump coal then falling on top of the slack. A chain haul 60 ft. long, driven by a 7 by 12-in. engine, elevates the mine cars to the dump floor. This chain haul, the engine and the two picking tables were built by the Vulcan Iron Works, of Wilkesbarre. The picking tables and screw conveyors are driven by a 12 by 16-in. Chandler & Taylor engine.

*Power and Boiler Houses.*—The power-house, which has brick walls, a concrete floor and slate roof, is 120 by 40 ft. It contains two Harrisburg compound, 15 and 25 by 15-in. engines, each driving by belt a double-current 150-kw. General Electric generator; and a simple 22 by 20-in. Harrisburg engine driving a 6,000-volt, three-phase, revolving field, 300-kw. General Electric alternator. Dry steam for the engines is provided by Sweet separators. The double current generators give a current of 600 amperes at 250 volts on the direct-current side, or a triphase current of 575 amperes at 169 volts and 25 cycles on the alternating-current side. Ordinarily the two compound engines give all the direct-current needed for outside haulage. In case one fails, the belt is taken off and another double-current generator is used as a rotary converter to step down current from the alternator. The alternator is ordinarily used to generate high-tension current for the sub-station in the mine and also to feed when necessary the rotary converter in the power house. Three General Electric oil-cooled, step-up static transformers (90 kw.) in the power-house have three taps giving voltages of 5,000 to 6,000 to allow the use of similar transformers in the mine sub-station, 9,000 ft. distant, at a reduced voltage. One static transformer is held as a spare for both the power-house and sub-station circuits. In the sub-station are three static transformers and a duplicate of the double current 250-kw. generators, serving as a rotary converter. The current, amounting to 350 h. p., is carried to the sub-station along a main air-way by a three-wire rubber and lead covered cable. There has been no trouble with maintaining insulation. The lead cover is grounded at intervals. The line loss is 5 per cent. The switchboard, of blue Vermont marble, has feeder and generator panels with watt meters, ammeters, etc. Another power-house contains Ingersoll-Sergeant straight-line compressors, with air cylinders 20-in. stroke by 24-in. diameter, delivering air at 85-lb. pressure. In one boiler-house are three tubular 100-h.p. boilers made by the Eagle Iron Works, of Terre Haute, Ind., and in another are two 250-h. p. Sterling boilers.

*Haulage.*—On account of the dip, gravity planes, electric and steam hoisting engines and electric locomotives are used for getting the coal from the rooms to the tipple. The openings are three drifts on water level and a slope. A four-compartment shaft, 12 by 36 ft., has been sunk two miles from the tipple, and will be used later to take coal from the B and E seams, but is now used for ventilation. At No. 3 mine, the main heading is on water level and two General Electric 13-ton locomotives haul trips of 45 to 50 cars the longest distance of about 2.3 miles. The mine cars are dropped to this main, heading over planes by electric hoists of Lidgerwood and of Flory make; one plane is 3,500 ft. long, and 20-car trips are hauled over it.

Mine No. 5 is driven on water level for 1,000 ft., then at an angle between the strike and dip for 5,000 ft. The trips are moved by a 20 by 30 in. engine at the drift mouth by main and tail rope, the main rope being 1⅛ in. in diameter. At the bottom of the slope is another water-level entry 1,800 ft. long in which trips are moved by a main and tail rope haulage engine, driven by compressed air; this heading turns and runs at an angle down the dip for 2,000 ft.

Mine No. 6 is a drift opening, the entrance being 800 ft. from the tipple. The main heading is driven on water level 1,000 ft., and cars are hauled to it up inside slopes by electric hoists. A 13-ton General Electric locomotive hauls the trips to the head of an incline plane which drops them to the tipple.



UNDERGROUND TRANSFORMER STATION, EHRENFELD COLLIERY.

The opening of mine No. 8, which is on the

E vein, is 2,500 ft. from the tipple. It is driven on water level, while the cross-headings are driven directly up the dip. A Morgan third-rail electric locomotive has given satisfactory service on these headings, taking as many as 25 empty cars up grades of from 8 to 12 per cent.

At the tipple the tracks are laid with 25-lb. rail, and the minimum radius of curves is 30 ft. The tracks, outside and underground, traversed by the 13-ton motors are laid with 40-lb. and 56-lb. rails, and the minimum radius of curvature is 60 ft. On headings underground, not traversed by the heavy motors, 25-lb. rails are used, and in the rooms 12-lb. iron rails. The men push the cars in the rooms. The mine cars are of wood, are of three sizes, and are 31 in. high from the rail to the top of the front gate, and hold, when topped, 2,800 lb. on an average. The trolley wire used is 0000 grooved.

*Drainage and Ventilation.*—As much of the worked area is above water level, drainage is not yet a serious problem. At the bottom of mine No. 5 are two large Goyne pumps, having water ends 10 in. by 3 ft., that throw to surface through a bore hole 360 ft. deep. One pump does the work, the other being in reserve, or used only in spring floods. Ventilation is by fans altogether. Of the mines, No. 3 and No. 5 are classified by the mine inspector as gaseous, No. 6 and No. 8 as non-gaseous. At No. 3 is a 16 by 4-ft. Guibal fan driven by a steam engine; at mine No. 5 a 13 by 4-ft. engine-driven Capell fan; mines No. 6 and No. 8 are ventilated by a 12 by 3.5-ft. Guibal fan driven by an electric motor. The fans exhaust in summer and blow in winter to help the natural ventilation.

*Mining Methods.*—The B seam is 44 to 48 in. thick, and is underlaid by about 3.5 ft. of fire-clay, carrying a 4-in. seam of coal, 18 in. from its top, that is shot up in getting height for entries. Above the B seam is 1 to 5 ft. of rather tender slate, which needs propping, or has to be taken down, and over that 2 ft. of sandstone that breaks nicely when pillars are robbed. The E seam is 46 to 48 in. thick, and is underlaid by 18 in. of slate with fire-clay below, and overlaid by 2 in. of slate, 8 in. of bone and 20 ft. of slate.

On the area worked in the B seam the main water-level headings are driven 120 ft. apart and 15 ft. wide. The next water-level headings, 500 ft. below, are separated by a 40-ft. pillar. The cross-headings, separated by a 30-ft. pillar, are driven at 560-ft. intervals, and rooms are turned right and left at 50-ft. intervals (20-ft. room, 30-ft. pillar). The rooms are driven 250 ft. long, with a 2 per cent grade in favor of the load. The ground will be divided into panels 560 ft. wide and 1,200 ft. long on the dip.

For working the E vein—which shows bone 0.15 ft.; coal, 2 ft.; bone 0.1 ft.; coal 1.6 ft.—at No. 8 mine, the following plan is blocked out. The main heading is driven almost on water-level, with a slight rise for drainage, 10 to 12 ft. wide, and is separated from a 15-ft. air-way by a 50-ft. pillar. The main heading is driven 5 ft. high from the top of the rail. The butt headings are driven straight up the pitch, which averages 10 per cent, there being a 40-ft. pillar between each heading and air course. The butt headings are driven the same height as the main headings and 18 to 20 ft. wide, gob along the pillar reducing the final width to about 10 ft. The rooms which are turned from one side only, at 60-ft. intervals, will be 300 ft. long, and as the distance from center to center of two headings and air courses is 500 ft., this leaves a 100-ft. rib pillar. The room necks are 25 ft. deep and 50 ft. long, and the rooms 35 ft. wide, leaving a 25-ft. pillar. The gob is stowed along the center of the rooms. Wood rails are used in the rooms and 40-lb. rails in the butt headings. The butt headings will be cut off about 1,200 ft. long by a second main level, leaving a 50-ft. chain pillar along the air course above. Pillars will be drawn in the usual way.

The Morgan locomotive runs trips along the main heading, taking current through an overhead trolley. On the butt headings the third rail is laid, and up these headings the locomotive will haul trips of empties dropping two cars opposite every other room, and on its return will pick up two loads pushed out by the miners opposite every other room. Mules are used in starting main or butt entries, ahead of the locomotive. The Morgan locomotive used weighs but 5 tons. The loss of current through the iron third rail has not proved nearly as serious as some critics of the locomotive expected. There is, when starting work, a loss of about 10 amperes that falls somewhat as the current dries moist contacts.

It is proposed to try mining a panel or two longwall, as the roof is expected to break nicely. The empties will then be dropped from the locomotive through a cross-cut and pushed across the working face within 5 ft. of it, to the loaded track on the next butt heading. The longwall system is practically not used anywhere in the Clearfield region and its trial at Ehrenfeld, if successful, will have important results.

Coal is undercut by pick and by Ingersoll-Sergeant and Sullivan punching machines, the machines being used in No. 6 and No. 8 openings.

Mr. Eli T. Conner, of Cresson, is division superintendent of the Pennsylvania Coal & Coke Company and Mr. W. A. Thomas is electrician.

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Laterite is a cellular reddish ferruginous clay, derived from the weathing of rocks in place. It is a characteristic surface formation in India and Central Africa.

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COST OF STRUCTURAL STEEL WORK.—In the construction of a new coal storage plant at the New York Navy Yard, there was used about 1,010 tons of steel, which it cost approximately $16 per ton to erect. The most expensive part of the work was the driving of the field rivets, the average cost per rivet being about 25 cents.

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DISTRIBUTION OF COAL IN POCKETS.—The new coal storage plant at the New York Navy Yard consists of a bunker divided into 19 bays, each 20 ft. long, straddled by the movable hoisting tower. The buckets of the latter discharge into a receiving hopper of 11 tons capacity, located in the center of the tower. A distributing car runs underneath the tower on a standard gauge track extending the whole length of the bunker. The car, which is operated by a 7.5-h. p. motor, consists essentially of a steel hopper of five tons capacity, supported on a recording scale. The car is designed to distribute 60 tons of coal per hour, the coal being dumped between the rails through hatches with removable covers, and is controlled by one operator, who sits immediately in front of the scale beam and checks the weight of all coal delivered into the bins.

## CHEMICAL CHARACTERISTICS OF LIMONITE (BROWN HEMATITE) IRON ORES.

BY F. LYNWOOD GARRISON.

The precise chemical nature of the limonite ores in the Paleozoic rocks of the Appalachian system appears to be by no means simple or entirely understood. The name brown hematite so often applied to them is misleading, since a hematite is, strictly speaking, an anhydrous oxide ($Fe_2O_3$) whereas these ores are hydrous and should be genetically considered as limonite, having the formula according to Groth of ($Fe_4O_3[OH]_6$). Groth[1] also uses the term "hydro-hematit," giving its formula as $Fe_4O_3[OH]_2$. The formula for limonite is often written $2Fe_2O_3.3H_2O$ which appears to be the most satisfactory construction. The older mineralogists used the expression red or brown hematite indistinguishably for both limonite and turgite ($2Fe_2O_3.H_2O$) or mixtures of the two. Groth considers turgite and hydro-hematite as one and the same thing.[2]

It would be much better if the name hematite could be restricted to the anhydrous oxide, and limonite to the hydrous. In coining the word limonite, Hausmann evidently applied it to ores found in valley bottoms or basins that were formerly lakes or swamps, since it is derived from the Greek *leimo*, a meadow. Though valleys and basins are probably a necessary condition to the accumulation of limonite ores, they are frequently found in the sides and tops of mountains, having been so elevated by dynamic action and changes subsequent to their deposition.

Instead of the confusing term brown hematite, the Germans call these ores *brauneisenerz*, that is, brown iron ore, a good distinctive and characteristic name. It is senseless to call ores found on a mountain (so called mountain ores) brown hematite and those in the valley limonite when the general chemical composition of both is the same. It is often true the mountain ores have been, at least in part, dehydrated, and are actually hematite; they have the characteristics of this mineral and are easily distinguished from limonite.

It is clear to even the casual observer that the limonite ores of the Appalachians are quite variable in their composition. Genth[4] long ago pointed out that such ores in Pennsylvania were distinct mechanical mixtures of a number of different minerals, the limonite of course greatly predominating. They are chiefly compounds or associations of limonite with hydrous ferric silicates. Genth found it impossible to determine the actual character of the accompanying silicate, whether anthrosiderite ($2Fe_2O_3.9SiO_2.2H_2O$) or degeroite ($Fe_2O_3.2SiO_2.3H_2O$). Hopkins observes that this silicate might be one of several of which chloropal ($Fe_2O_3.3SiO_2.5H_2O$) is a common form.[6]

The name limonite was first applied especially to bog ores by Hausmann in 1813. In 1832 Beudant used the name in connection with bog ores as well as others of a similar nature.

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[1] 'Tabellarische Uebersicht Mineralien' (1889), p. 43.

[2] *Ibid*, p. 43.

[3] Dana, 'System of Mineralogy,' Fifth Edition, p. 17.

[4] Second Geological Survey of Pennsylvania. Vol. 874, pp. 46, 48, 52, 143, 144, 149.

[5] *Proceedings* American Philosophical Society, Vol. XIV, p. 94.

[6] *Bulletin* Geological Society of America, Vol. XI, p. 480.

The hydrated ferric oxide itself commonly exists in nature in a dual form as a crystalline mineral, goethite, composed of one part iron oxide to one of water, *i. e.*, $Fe_2O_3$ $H_2O$, with a specific gravity of 4.4 and the amorphous variety limonite, whose specific gravity varies from 3.6 to 4.

Some of the ores also contain greater or less quantities of manganese, mostly in the condition of the so-called bog manganese or wad ($NnO+5H_2O$) also pyrolusite ($Mn\ O_2$) and psilomelane ($Mn\ Ba\ K_2)_5\ O_9+H_2O$[7]. Between the extremes of pure iron ore and pure manganese ore, if in fact such can be said to exist in either case, are numerous gradations of chemically and mechanically mixed oxides of iron and manganese, the iron oxides vastly predominating; in fact, manganese preponderates only in sporadic occurrences, and seldom or never in any considerable quantity. This condition characterizes the ores of Shady Valley, Tennessee, and can be accepted as a general rule for nearly the entire Appalachian system, though of course exceptions, such as the notable one at Crimora, Virginia, do exist. This fact would seem, in some degree, to be the explanation for the numerous failures to develop such manganese deposits into paying mining propositions. Frequently what, on the surface, appear to be good deposits of manganese ore, are found upon development to represent only mere incrustations of manganese oxides upon iron ore, which may or may not be of value as an iron deposit, but are pretty certain to be absolutely worthless as a manganese mine. The earthy manganese oxide wad is apt to be misleading; it imparts a black color to the clays near the ore-bodies, giving the impression of the presence of manganese in quantity, which is seldom the case since the black material is nearly all removed in the washing, leaving a clear iron ore containing perhaps very little manganese, unless the iron be combined chemically, mechanically, or both, with pyrolusite. In such a case, there may be sufficient manganese oxide present to unfit the ore for the manufacture of foundry iron, but rarely too much for basic pig.

Hopkins has computed the hypothetical combination of the various minerals found with limonite from a number of different localities in Pennsylvania. He assumes that the phosphorus unites with the alumina to form the mineral wavellite, which is highly probable, and that it also combines with the iron to form vivianite, the silica coalescing with the iron as grünerite. If one of the hydrous ferric silicates is formed, the proportions would be slightly changed, as shown in the third combination. After forming the wavellite, the remaining alumina is in the form of kaolin, and the remaining water and iron are combined so as to form all the limonite possible and the iron in excess is put into goethite, the next highest oxide.[8]

| 1. | Per cent. | 2. | Per cent. |
|---|---|---|---|
| Limonite $Fe_2O_3 3H_2O$ | 77.79 | Limonite | 75.65 |
| Goethite, $Fe_2O_3 H_2O$ | 8.07 | Goethite | 9.61 |
| Grünerite, $FeSiO_3$ | 8.40 | Grünerite | 8.59 |
| Wavellite | 0.78 | Vivianite | 1.95 |
| Kaolin | 1.30 | Kaolin | 8.70 |

If the silica is combined with the iron in the form of anthosiderite, it will be seen that the remaining iron and water in No. 5 will be in the proper ratio to form limonite, and hence this seems a probable combination;

[7] This formula is sometimes constructed (BaO MnO $K_2O$) $MnO_2+Mn_2O_3+H_2O$.

[8] *Ibid.*, p. 482.

Hypothetical Combinations of the Elements in the Limonite Ores.

Computing the excess of silica as anthosiderite.

| | No. 5. | No. 1. | No. 2. | No. 6. |
|---|---|---|---|---|
| Limonite | 92.80 | 65.72 | 54.23 | 44.51 |
| Goethite | .... | 23.49 | 39.95 | 44.70 |
| Anthosiderite | 5.91 | 4.05 | 4.06 | 2.39 |
| Wavellite | 0.39 | 0.993 | 0.45 | 0.76 |
| Kaolin | 0.77 | 1.29 | 0.26 | 3.61 |
| Quartz | .... | 2.60 | 0.44 | 0.44 |
| $Fe_2O_3$:$H_2O$ (molecular) | 496:747 | 478:652 | 515:660 | 506:625 |
| | 2:3 nearly limonite. | 3:4 nearly. | 4:5 nearly. | 4:5 nearly. |

Computing the excess silica as chloropal.

| | | | | |
|---|---|---|---|---|
| Limonite | 63.60 | 34.78 | 36.85 | 33.66 |
| Goethite | 26.52 | 50.73 | 59.10 | 57.85 |
| Chloropal | 8.60 | 8.62 | 5.92 | 3.01 |
| Wavellite | 0.39 | 0.99 | 0.45 | 0.76 |
| Kaolin | 0.77 | 1.29 | 0.26 | 3.61 |
| Quartz | .... | 2.60 | 0.44 | 0.44 |
| $Fe_2O_3$:$H_2O$ (molecular) | 489:660 | 471:564 | 510:599 | 505:595 |
| | 3:4 nearly. | 4:5 nearly. | 5:6 nearly. | 5:6 nearly. |

but in Nos. 1, 2 and 6 the iron and water are in the proportion of 3:4 and 4:5. If Chloropal is formed, the iron water ratio is 3:4, 4:5 and 5:6. It is possible that iron and water may combine in these variable ratios; but until it can be proven in some way, it seems better to consider them as forming mixtures of the established compounds, limonite and goethite or turgite.[9]

It is certain some silica enters into chemical combination with the iron but the greater part of it is simply mechanically united in fine particles. Similarly minute specks of clay are thrown down with the iron precipitate, forming a very close association with the ore which cannot all be removed by washing.

It is evident the same solutions that carry the iron also contain silica in solution which may or may not be deposited along with the iron according to the presence or absence of conditions not as yet entirely understood. In the Shady Valley deposits the clays are full of irregular, angular grains of silica, also many perfectly formed, and often doubly terminated quartz crystals. That waters carrying iron have a strong solvent action on silica is shown by the dissolution of the chert, shale and sandstone fragments found in the ore masses and breccias.

Other iron minerals are often present with the limonite, such as ilmenite $(TiFe)_2O_3$, siderite ($FeCO_3$) and iron pyrite ($FS_2$). In considering the genesis of the limonite ores, it will be seen how significant the presence of siderite and pyrite may be in this connection as an evidence of the source of the iron, or at least a step in the evolution of the limonite deposits.

[9] Loc. cit., p. 483.

STEEL CHIMNEYS.—The E. Keeler Company, of Williamsport, Pa., has just completed an 8-ft. steel chimney, 230 ft. in height, to be erected in Mexico. The steel chimney 8 ft. in diameter and 217 ft. in height, at the Ridgewood pumping station of the Brooklyn water works, has heretofore been claimed to be the highest steel chimney in America.

PROTECTION OF STEEL-WORK.—In the construction of the new coal storage and handling plant at the New York Navy Yard, where the steel-work is constantly exposed to the corrosive action of salt air, the Government engineers required that all the structural steel work be given a coat of the best red lead before leaving the shop, all contact surfaces an extra coat before assembling, and after erection two coats of dark green graphite paint. The corrugated galvanized iron was given two coats of graphite paint, the first dark green in color, the second slate.

## PRESENT PRACTICE OF CYANIDATION IN THE BLACK HILLS.—II.

By WILLIAM MAGENAU.

*Character of Ore.*—Under this head, on Table II, abbreviations have been adopted, which a brief reference to Black Hills ore deposits will explain. The ores cyanided are of four distinct classes:

1. The zone of mineralized hornblende schists occurring in the Archean, with quartz stringers and about 8 per cent of iron sulphides. The Homestake mine is the only one in this class, and the tonnage is about three times that of all other classes combined. This is primarily an amalgamating ore, however, as some 75 per cent of the values are recovered in that way before cyaniding. As at present mined, it carries about $4 per ton in gold, and an insignificant amount of silver.

2. The silicious shale ores, referred to in Table II[1] as "Sil." These occur as horizontal beds of silicified lime shales and dolomites (about 80 per cent. $SiO_2$), usually 5 or 6 feet thick, occurring in the Potsdam quartzite which overlies the Archean, and is usually capped by porphyry. Near the surface these deposits are oxidized, and readily yield from 70 to 80 per cent of their values to cyanide treatment; but large bodies of a closer texture are found which carry fine-grained pyrite (locally known as 'blue ore'), and give an extraction of from 30 per cent to almost nothing. Roasting this blue ore increases the extraction to 80 per cent, but ordinarily the values do not justify this. Ores of the silicious shale deposits now being milled range in value from $4.50 to $10 per ton; probably $6 would be an average, these values being in gold. Silver is in small amounts, 1 oz. or less, of which 30 per cent is extracted.

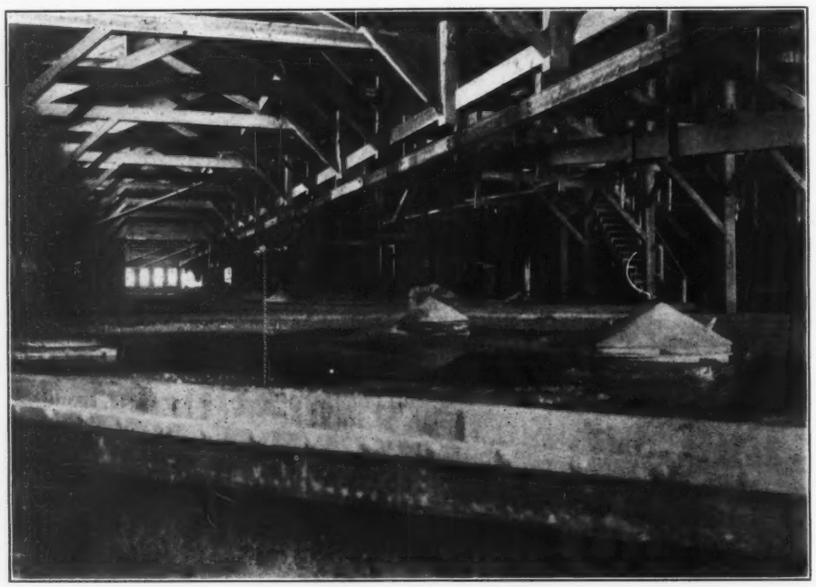
3. Quartzite ores. These are beds of the Potsdam formation, which enclose the silicious shale ores above-described, and have themselves become impregnated with the precious metals. Being highly silicious and clean, they are amenable to cyanidation; in tenor they are similar to the shales. The exact amount of this ore mined was not learned, as it is mixed with the shale ores in treatment, but probably the proportion is roughly as 4 of shales to 3 of quartzite.

4. Silicious lime, treated at present by only one mill (K), though the Deadwood-Standard was also running on this ore up to a few months ago. The ores are in horizontal beds of the Carboniferous strata overlying the Potsdam quartzites. The beds, ordinarily from 6 to 8 ft. thick, are composed of a uniformly silicified limestone, with occasional soft shales. The average tenor, as now profitably milled, is under $5 in gold, there being absolutely no silver. This feature is unique, and induces a special interest in the metallurgical treatment, especially as regards precipitation, which is excellent. The occurrence resembles another notable cyaniding ore, that at Mercur, in Utah. Both are silicified limestones of the Carboniferous; both carry mere traces of silver; both give successful extraction with only coarse crushing; the ore bodies are of similar shape, and occur near porphyry. In this ore the gold is evidently in an exceedingly fine form and of uniform dissemination, since the various sizes of a sample crushed and divided by a series of different meshed screens show no variations in assay at all; and extraction seems to depend on fineness of crushing only

[1] Reference is here made to the tables given in our issue of last week.—EDITOR.

so far as washing out of the solutions is affected. One sample of roughly crushed ore, containing $15 per ton, yielded over 80 per cent after 30 minutes' agitation.

There is a fifth class of ore which has been treated, but the tonnage is now insignificant and only incidental to the mining of other deposits. This is a conglomerate, locally known as 'cement ore,' which occurs along the contact between Archean schists and Potsdam quartzites.



SAND TANKS, MOGUL MILL.

*Separation.*—The cone system of separating sand from slime has been referred to. The final, or upward-current, cones at the Homestake cyanide plant No. 2 (omitted from these tables) are made with 40° apex instead of 60°, as at plant No. 1, and of large diameter, the steeper sides giving freer discharge to the thickened pulp. Those at plant No. 1 were known to be too small when put in, but available space was limited.

At several mills, a concentric inner cone was tried, also the introduction of air under pressure, but, in nearly every case, these modifications have been discarded in favor of a plain cone. This is constructed of heavy sheet iron, with cast fittings at the apex, where a plug valve is used, or a plain nipple of requisite size, to be replaced when it is worn too large.

Pressure on the upward stream of fresh water (or decanted cyanide solution from slime treatment, which is sometimes used) is maintained as nearly as possible constant. At the best mills this is done automatically by means of float valves; a head of 6 or 8 ft. above the apex of cone is secured, or say 3 or 4 ft. above the top surface.

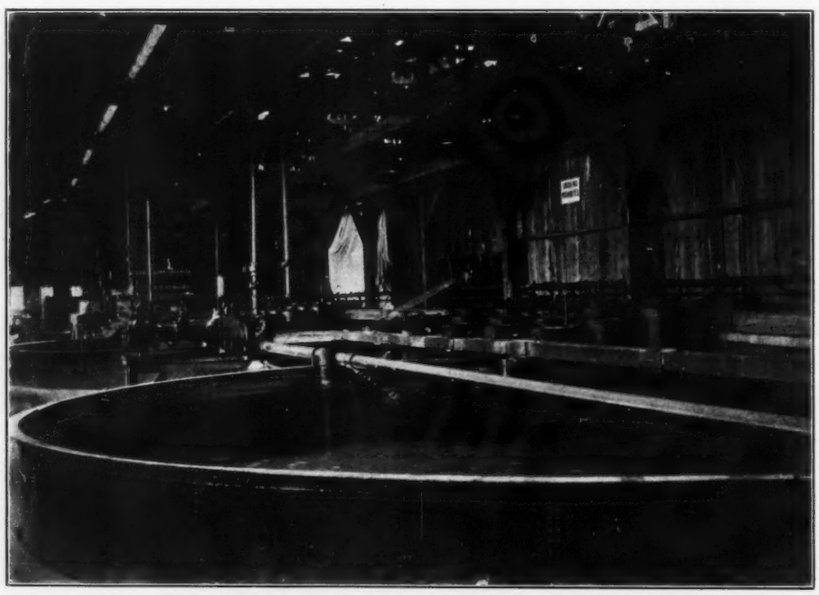
The ratios of sand to slime (as given on Table I) have no relation to sizes of these products, and only indicate the division made at each particular mill into material treated by percolation, and by agitation. Where both products are treated it is not so important to regulate the matter exactly, except to keep the amount of true slime going through with the sand down to such a proportion as will not lower the leaching rate too much (3 to 5 in. per hour is common), nor cause uneven leaching. At mill F, it is important to keep sand out of the slime, because it tends to settle in the Moore process tanks, and prevent good action of the filter. At mill A, the slime being thrown to waste, it is, of course, endeavored to separate every particle of leachable material. At some plants, as B, the separation is guided entirely by limitations of tankage, in this case the slime equipment being inadequate, necessitates treatment of an undue proportion with the sand, and even limits the mill's capacity.

*Sand Treatment.*—At most mills the tanks are of wood, and dimensions indicate outside diameter and length of staves.[3] The tonnage capacities given are those used by the operators. At mill A, are the largest tanks used anywhere in the world, and at plant No. 2 of the same company, five of double the capacity are in use, being 54 ft. in diameter and 13 ft. deep; this unit is unquestionably too large, since the time required for filling—two days—seriously cuts down the treatment period. At all wet crushing plants the filling is done by a distributor of the rotary sprinkler type, one such serving for a row of tanks by running on an overhead rail. The discharge is effected by sluicing.

It will be noted (from Table II) that the durations of treatment vary considerably. Opinions differ as to the economy of lengthened treatment, as the ores rarely yield anything after the first 100 or 120 hours. At two or three mills where treatment is longer than the average the practice is followed only because sufficient tankage is available. Careful experiments at mill C, however, go to show that a treatment over three times as long as the average, combined with the passage of a great bulk of solution, amply repays the extra outlay for tanks, cost of handling solution, and additional losses in zinc and KCy,—the latter being practically nil. It is estimated that an additional saving of 2 or 3 per cent is made, amounting to, say, 25c. per ton, which would certainly pay handsomely.

In general, the length of time necessary, as well as the percentage of value ultimately extracted, is proportional to the oxidation of the ore, and therefore the results at mill C, as above, may be exceptional. This is illustrated by mill L, whose ore supply comes from open cuts and is only coarsely crushed. Forty-four hours' leaching gives fair extractions on an ore carrying less than $4 per ton.

In the second column under Sand Treatment (Table II), will be noted the ratio of solution to material treated—a factor considered of great importance. At mill C the result of passing the solution over and over through the charge was found, as above stated, to be much better than from quiet contact. It is a question how much of this benefit is due to breaking up of uneven leaching, and how much to aeration and fresh contact. Contrasts between the wet and dry crushing plants will be noted in the same column, the latter obtaining the same extraction with one-tenth the proportion of solution.



PRECIPITATING BARRELS AND SUMP TANKS.

*Slime Treatment.*—Slime tanks of both iron and wood are used. For the latter, dimensions (as given on Table I) are outside diameter and stave length, and throughout, in calculat-

[3] In all cases, tank dimensions are not intended to be imnutely accurate, since it would complicate matters to go too much into detail, and be of no especial value.

ing net volumes, the outside figures were used, and 10 per cent deducted. The proportion of tankage volume in mill E was recognized as too small. The contrast in tank equipment in wet and dry crushing plants is noticeable, the total ore tankage of the latter per ton treated being about the same as the sand department of the former. Solution tankage is also less; a saving in equipment which is, however, counterbalanced by the ore-drying furnace of the dry-crushing plants.

At one time mill J separated slime (as dust) by an air suction arrangement, conducting the material into a tower fitted with baffles and a spray of cyanide solution, from which it was sluiced to tanks and agitated by compressed air, and decanted as usual. This was abandoned later, and the dust is not now treated separately; in fact, is not collected at all, being of low value.

At the Homestake mill (A), the slime, amounting at present to about 35 per cent of the ore crushed, is run to waste, as it carries only $1 per ton, compared to $1.65 for the sand; but experiments on the treatment of the sand by a new method are in progress, and Mr. Merrill hopes to solve the problem.

At all other wet crushing mills, but one, in the district, slime is treated by the decantation method, the assay value being the same as the sand ($4.50 to $10 per ton). One mill, as will be noted in the tables, uses the new Moore process, consisting of a nest of flat filter bags, or frames, which can be immersed in and removed from the agitated pulp while suction is being applied inside the bags, causing the clear gold-bearing solution to pass into them and thence to zinc boxes, and the slime residue to adhere to the outer surfaces in cakes for subsequent automatic removal. While this plant has been in operation only a few months, it appears to be successful, and the obstacles encountered are only such as appear in every novel mechanical contrivance. This plant has been longer in continuous operation than any of the kind yet installed, and justifies strong confidence in its future.

The decantation method, as here practiced, is made possible by a slime of excellent settling qualities, lime being used to assist. So perfect and rapid is the settling, that tanks of ordinary diameter (20 ft.) are decanted while they are filling; in fact, decantation is commenced when a depth of only 4 or 5 ft. has been reached, the stream of entering pulp being arrested by a simple baffle. Charges are readily decanted down to 60 per cent moisture before discharging; and with special care and using the scheme of drawing off a few inches of the uppermost layer of settled slime (which is probably three-fourths water) into the tank which is to receive the next charge, the moisture is brought below 50 per cent. The Moore process, as at present operated at mill F, reduces the moisture in discharged slime to less than 35 per cent.

For agitating the slime centrifugal circulating pumps are in use at most mills; a few use compressed air applied through perforated pipes laid in the bottoms of the tanks. Ordinarily five or six successive agitations and decantations are given each charge. A noteworthy feature of the decantation practice here generally adopted is the filtering of the first one or two decantations from a slime charge through a charge of sand before precipitation, thus at once clarifying and enriching it. The subsequent decantations are usually run to a sump from which the storage tanks above the batteries are supplied, KCy being there added. This arrangement does away with filter tanks, and reduces the amount of solution precipitated.

Filter-pressing is under consideration at one plant which is deterred by its site from discharging slime wet enough to run, that is, containing over 35 per cent moisture.

*Solutions.*—The solution tankage (as given on Table I) has been calculated as was done with the slime tanks, viz., outside dimensions minus 10 per cent. It will be seen (by Table I) that a wet crushing mill using comparatively coarse screens, and hence less solution in the battery, and having small storage and sump tankage, gets along with about the same amount of solution in the mill per ton of ore treated as a dry crushing plant; but a contrast between the two systems is seen when the amounts of solution precipitated are considered.

Strength of solutions in KCy is commonly determined with standard $AgNO_3$, taking a 10-c.c. sample without dilution, and using KI indicator. Only slight variations from these results are observed if no indicator is used, such as have been encountered elsewhere, notably at Mercur, where the variation (with diluted sample) is often 300 per cent; and at Cripple Creek, where in one instance it was 20 per cent,—discrepancies which are still unexplained.

Protective alkalinity is alkalinity due to alkalis other than KCy, and is determined by adding a slight excess of $AgNO_3$, a drop of phenolthalein, and titrating to an end with N/10 ($H_2SO_4$). While the theoretical accuracy of this method is open to question, it is sufficiently close for the rough guidance for addition of lime, which is controlled in the end by observation of the zinc precipitation, and settling of the slime in the wet crushing plants, care being taken not to have too much for one nor too little for the other. Consumption of cyanide is also materially affected. Two chemists use total alkalinity (obtained by titrating a solution sample direct with N/10 $H_2SO_4$ and phenolthalein) as a guide, and this, being ordinarily proportional to the 'protective,' serves the same purpose.

*Precipitation.*—In spite of a general prejudice against them, wooden barrels are in use at most plants, the advantage originally claimed being facility in cleaning up. In doing this, each barrel is picked up by an overhead tackle riding a rail, and conveyed to a central point where it may be dumped for screening. The plan seems to do very well in a small plant where almost any arrangement will answer, but on a large scale it is exceedingly cumbersome.

At mill A, as noted, zinc dust is used, with variations which seem to give better results. The process, together with the novel mode of refining the product, is described in Mr. C. W. Merrill's paper already referred to. The low grade of product made by the zinc dust process is noticeable (on Table I), due to the fact that *all* the zinc applied is cleaned up with the precipitated gold; from which there is also the advantage of a complete clean-up and no locked up values as with zinc shavings. The product being low grade, refining facilities must be large, but even so, the costs per ounce of bullion produced (taking into consideration its relative tenor in gold and silver —see Table II) are moderate (about 12 c.) This does not include removing product from the presses, but as here carried on, this is a small item. The great advantage claimed for the refining method (cupellation), far outweighing lower costs of operation, is the elimination of losses, which are stated to be less than 0.1 per cent, against 2 to 6 per cent by the usual melting method.

The cost of installation of the zinc-dust precipitation process and the cupellation refinery is very high—several times the shavings and melting equipment; and for this and other reasons, it is essentially adapted to large tonnages. The low zinc consumption (remembering the very low grade of material treated—$1.65 per ton) speaks for itself.

The precious metal contents of product as taken from the zinc boxes are given in Table II, though a rather rough estimate had to be made at most plants, since the proportion is variable and notice is not taken of it. It is valuable here in studying the zinc consumption to gauge roughly (what should be accurately known) the proportion between chemical and mechanical consumption. The grade of product, as cleaned up, is largely a matter of individual practice, often influenced by the desire to get a close clean-up. The ratio of gold to silver is also a large factor. In general, it will be seen that the consumption is universally proportional to the grade of product, indicating a relatively high mechanical consumption. Plant K gets a notably low consumption for a solution quite free from silver; but the practice here, is to leave much metal undisturbed in the boxes—which is desirable where circumstances permit. The effect of solutions strong in KCy and high in gold and silver on zinc consumption per ton of solution precipitated is seen in the dry crushing plants.

The ratio of gold to silver in the ores of the Black Hills is variable, not only at different horizons, but in the same mine. The figures given are rough averages. Only gold values are taken into account in the cyanide work, at most plants no assays at all for silver being made.

*Commercial Results.*—Detailed costs for each mill are not given for the double reason that they are not always obtainable for publication, and that they have not the value to men in other fields appertaining to an accurately generalized figure. Many cost figures from this district have been given which are misleading, because not representative; each mine and mill is a 'proposition' unto itself; and its cost sheet is instructive only when one is familiar with the detailed conditions governing there. Figures are therefore given for each class of mill, which have been arrived at after careful enquiry, and represent what may be duplicated under reasonably good conditions,—that is to say, a steady supply of $4 to $10 are from the oxidized zones (except on the Homestake zone, whose base ores are favorable) and with good design and management of plant.

1. The Homestake mine, forming a class by itself, amalgamates 4,000 tons per day of $4 schistose gold ore, for 40 c. per ton, and cyanides and sand (2,150 tons per day) for 30 c. per ton.

2. A mill, wet crushing with stamps, and treating, say, 125 tons per day, the sand by percolation and slime by decantation, will operate at a cost of from $1.25 to $1.50 per ton, including everything except interest and depreciation. Lower costs than this have been attained, but under exceptional conditions of location, or on ore requiring comparatively coarse crushing, or by elimination of repair charges. Higher costs than this may be said to be due

to influences not fairly chargeable against a process—shortage of ore, glaring (and sometimes unavoidable) faults of sites, design, management, etc.

3. Fine dry crushing plants handling the same ores as the preceding, and crushing to the same or even finer mesh, and on the same tonnage, will operate at a similar cost—$1.25 to $1.50 per ton.

4. Coarse dry crushing plants, of which there are but two, have their total costs below $1 per ton on a daily tonnage varying from 100 to 200.

*Ruling Prices.*—Ruling prices under which the above costs are as follows:

Labor is generally $3 to $4 per 12-hour shift for mill hands.

Bituminous coal costs $3.50 per ton at the mills. When remote from the railroad the price reaches $4.25 to $4.50.

Water is pumped from mines, wells and streams, usually at moderate expense; it is sufficiently cheap and plentiful so that tailings may be discharged from tanks by sluicing. Most mines, however, do not produce enough to run a mill, necessitating a site on some stream at a distance and entailing a charge of from 30 to 75c. per ton of ore for railroad haul.

Quicklime costs 35c. per bushel at the mills.

Potassium cyanide averages 23c. per lb.

Zinc, in sheets, costs 7 to 8c. per lb.; as dust (Belgian) 7c. per pound.

*Extraction.*—This, like the costs, has been put aside for separate discussion, for the same reasons. The following figures, based on actual returns of (gold) bullion and dry weights of ore, are believed to be correct averages. Silver values are not considered. Ordinarily, only 1 or 2 oz. per ton is present, and of this 30 per cent is extracted.

1. Approximate figures given out by the Homestake company are 70 to 75 per cent extraction on amalgamation plates, and 75 per cent of the value in the sand (which carries 75 per cent of the values rejected by the plates) by cyanide, making a total extraction of nearly 90 per cent.

2. Wet crushing plants treating both sand and slime are obtaining from 70 to 80 per cent from $4 to $10 material, depending primarily on the degree of oxidation of the ore. For the average ore 70 to 75 per cent is the best attainable.

3. Fine dry crushing plants extract from 75 to 80 per cent from $8 ore, going down to 70 per cent and below if ore is base.

4. The two coarse dry crushing plants, operating on exceptionally favorable, thoroughly oxidized ores carrying $4 to $5, get from 75 per cent at one plant to 85 per cent at the other, averaging around the latter figures for long periods.

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WATER-PROOFING CONCRETE.—The thorough water-proofing of concrete walls and floors is apt to be troublesome. Albion S. Howe, of San Francisco, in a recent contribution to the *Transactions* of the American Institute of Mining Engineers, stated that in San Francisco there is a pump-room, 50 ft. in diameter, with a thin floor of re-inforced concrete, and an exterior wall of concrete 5 ft. thick at the base and 2 ft. at the top. On the sand beneath the floor a sheet of asphaltum roofing felt was laid, the joints being cemented with hot asphaltum. The exterior of the circular wall was covered with asphaltum about .125 in. thick. The wall withstands a water pressure of about 18 ft. head and the interior is perfectly dry.

## THE BRIQUETTING PLANT AT STOCKTON, CALIFORNIA.

By Robert Schorr.

The largest briquetting plant in the United States is owned by the San Francisco & San Joaquin Coal Company. It is located at Stockton, Cal., 35 miles from the company's mine at Tesla and about 90 miles from San Francisco.

Prior to the production of oil in California on an extensive scale the company's product—an old lignite of about 11,000 B. T. U. heating value—found a good sale around Stockton as locomotive and steamer fuel. At that time every effort was made to extract the bulk of the lignite in lump form for domestic purposes. At the present time the whole product of the mine is converted into briquettes, and it is immaterial how much fine coal is raised. The company's railroad from the mine to Stockton is considered one of the best roads in California. The trains pass over the main bunkers of over 4,000 tons capacity situated on the water front.

A portion of these bunkers is used for briquettes and one part also for purchased coal screenings. Underneath those compartments containing the raw coals are conveyors, and there are a number of bottom-discharge doors to feed the coal thereupon. The conveyors carry it to a hopper located above the disintegrator and the crushed coal is elevated about 40 ft. and hence conveyed to the briquetting plant.

The disintegrator is situated underneath the bunkers; it is a No. 3 Williams crusher driven by means of a counter-shaft from a 100-h. p. electric motor. When the briquetting plant started, about four years ago, the coal was crushed entirely too fine, most of the product passing through a 30-mesh screen. This made a very handsome looking briquette, but a rather poor one for obtaining a complete combustion. This fine crushing was done on a Stedman pulverizer, but when reconstructing the works after their destruction by fire in 1902, it was decided to crush only to about .125 in. size.

The Williams crusher does very well on dry coal, and the cost of repairs is slight, but when the coal is wet the cage clogs. The raw material for the briquettes as mentioned before are the company's lignite and screenings purchased in San Francisco. The first mixing of these two fuels is effected when passing through the disintegrator. The fine coal enters the briquetting plant at an elevation of about 35 ft. above floor line and it is dumped there into the main receiving bins. From these, chutes lead to the five dryers, which are simple externally fired revolving cones of 3 to 4 ft. diameter and 20 ft. length.

In getting up the preliminary plans for the work we designed a large shelf drier to evaporate about 9,000 lb. of water per hour. This idea was dropped and there is no doubt that the division into small drier units is far more advantageous under the circumstances. All driers discharge into a collecting screw conveyer, which forwards the dry coal into the main mixer. All driers are driven from one common counter shaft by means of bevel gears, and the screw conveyer is operated by a chain drive.

During the summer months the coal is commercially dry and no fire is used under the drier. In this case the coal is sufficiently heated by passing about 6 ft. in the steam-jacketed mixer before meeting the binder. The mixer is of the ordinary horizontal double-shaft, pug-mill construction. It is about 30 ft. long and 36 in. wide. The binder used is asphaltum pitch, made in the company's own oil distillery plant located about 120 ft. away from the works. It is pumped over into a steam-oiled steel tank of about 6 ft. diameter and 8 ft. height. This tank is placed close to the mixer and the binder is fed in proper proportion into it, about 6 ft. distant from the coal feed end.

The material leaving the mixer is too hot and sticky for the press. For that reason it is conveyed by a series of belt conveyors outside of the building and in this way it is cooled off sufficiently. A short conveyor returns the material into the building at a higher elevation, dropping it into a small wooden box for further distribution to the two presses by means of two short conveyors. The presses are of the continuous acting type. The drawings were prepared by the writer in 1898 while in the employ of Messrs. Connor & Grant, in San Francisco. The press is a complete success, and it is an extremely interesting sight to see a steady stream of coal flow into the machine and a steady flow of briquettes issue from underneath.

Both machines are designed for 7-oz. boulets and each of them is capable of making 990 briquettes per minute, or over 13 tons per hour. The briquettes are carried by conveyors to the distributing conveyors located above the bunkers. The briquettes are very solid and when the bunkers are empty they drop about 30 ft. without injury to them. The briquettes are usually withdrawn right away and loaded on cars for shipment.

The plant is entirely automatic and only six men are employed, part of their time being used at the distillery and yard.

To simplify the supervision of all furnaces the boilers are located near the driers in the main building, oil being used as fuel. The engine-room forms a separate annex. The oil stills and superheater in the refinery are also fired with oil. The distilling products are condensed and refined in the usual manner. Part of the residue, the asphaltum, is pumped over to the works and part of it is available for sale. The whole works are under the intelligent supervision of Mr. G. H. Bradford, who was Mr. Treadwell's assistant during the construction period. The reader will realize that a plant of such magnitude and originality required a large expenditure of energy, thought and money.

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MINERAL PRODUCTION OF GREECE.—The German Consulate at Athens reports the following statistics covering the production of minerals and metals in 1903, the figures being in metric tons: Iron ore, 360,310; manganiferous iron ore, 152,520; manganese ore, 9,340; chrome ore, 8,478; lead ore, 16,700; argentiferous pig lead, 13,270; lead fume and other lead products, 4,254 tons.

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PRODUCTION OF OIL AT BAKU.—According to the *Petroleum Review* the production of the Baku oil-fields during the past half of 1904 amounted to 304,900,000 poods, against 312,500,000 poods in the corresponding period of the previous year. This shows a continuation of the retrograde movement that began in 1902. The most notable decrease was in the production of spouting wells, which fell off from 31,600,000 poods to 16,700,000 poods last year.

## NOTES ON TUNGSTEN DEPOSITS IN ARIZONA.

By Forbes Rickard.

Deposits of tungsten ore of more or less economic importance occur in the Little Dragoon mountains, Cochise county, Arizona. Some of these came under my observation quite incidentally. Whether definitely recognized or not, these ores of tungsten must have been known to prospectors many years ago, but only in the past five years have they been worked, and then only spasmodically, as the market indicated a more active demand. Within this period, considerable work has been directed toward the development of numerous veins within a mineral belt, approximately four miles long in an east-west direction and two miles in width. This area has been pretty thoroughly prospected by surface cuts, pits and shallow shafts; the deepest shaft reaches a depth of something like 80 ft. below the surface. The main ridge heading the several gulches, in which the tungsten mineral has been found in placers, has been perforated by many tunnels crowded into a very small space.

QUARTZ VEIN IN PINAL SCHISTS, DRAGOON MOUNTAINS.

The ores of tungsten here found include the mineral varieties of hübnerite, wolframite and scheelite, their production in respect to quantity being relatively in the order named. The hübnerite mineral occurs massive at times, but more generally in platy crystals in a gangue of quartz and aplite. In one observed instance, it was distinctly dendritic in form.

Concerning the geological features, it may be stated briefly that the mountain range which is the locus of these deposits consists of a series of rocks embracing pre-Cambrian crystalline schists unconformably overlain by quartzite and limestones of Cambrian age. These rocks have been subject to intrusion by a central massive core of granite which has itself been subsequently penetrated by dykes of granite and granite-porphyry. These latter rocks are intimately and directly connected with the ore deposits and are of paramount significance in explanation of the mineral agencies that have combined to form the wolfram deposits which are found in aplite veinlets and sometimes in the fissure-filling quartz.

The main granite core has all the appearance of a normal feldspar granite, quite coarsely crystalline and with feldspar weathering out conspicuously in orthoclase prisms of unusual size. It crumbles readily, and is easily disintegrated to a granite sand. The weathering or surface decomposition of this granite shows in characteristic rounded boulders, which are grouped in picturesque array and in fantastic shapes. These granites are extensively sheeted, the plane of sheeting being sometimes parallel to the range themselves and at other times takes a different direction, running at more or less of an angle to the veins.. The granite-porphyry intrusive in the main mass of granite is less coarsely crystalline and usually takes something of a dike form. In some instances hornblende enters into the composition of the rock and the triclinic feldspar predominates so as to bring the rock within the classification of a quartz-diorite.

The ore deposit is distinctly a replacement deposit, that is, a deposit in which the feldspar of the granite has been replaced through the agency of tungsten-bearing solutions and the tungsten mineral substituted in its place. I have found in the gulch-gravel deposits some extraordinarily perfect tungsten mineral in the guise of typical orthoclase feldspar prisms. Such substitution is doubtless the product of metasomatic action.

The vein-forming mineral is here of two descriptions: 1, Tungsten ore, principally hübnerite, in aplite veinlets and crystalline quartz occupying fissures in the granite. The aplite mineral is distinguished by the prospector as differing from ordinary vein quartz and is designated by him as 'bull quartz.' 2, Tungsten ore, hübnerite and wolfram, due to the alteration of the encasing wall rock and distinctly flanking the vein itself, sometimes on one side and sometimes on both sides of the vein. This vein filling is softer than the quartz matter and is plainly the source of the tungsten ore pseudomorphs noted in the foregoing paragraph. The demarkation between vein and vein walls is not generally distinct and transition is more often gradual.

The first division subdivides itself under the heads of aplite veinlets and quartz proper; and this again suggests the question of the origin of the vein filling generally; also the question as to how far the quartz of these veins must be considered as an altered form of granite derived by process of silicification. I noted fissure-filled quartz veins showing interlocking quartz crystals; I also noted other veins in which the sheeting of the granite was very plainly retained and preserved in the quartz mass. Much of this quartz showed grooved slickenside faces; this latter is manifestly the altered granite rock which at some time has been subjected to movement along the plane

APLITE VEIN ENCASED IN GRANITE, DRAGOON MOUNTAINS.

of the vein, but the process of silicification has not obliterated the characteristics of the original rock.

The source of production of wolfram ore from this mineral zone has been two-fold, part being mined from the mineral vein or lode, and in part picked up and separated out of the gulch gravels by placer working.

In strips of vein there have been remarkable occurrences of ore in rich bunches, from a few pounds of almost pure hübnerite in crystal form, to as much as four to five tons of clean ore of 50 per cent to 60 per cent tungstic acid ($WO_3$) content. From small spaces of thinly bedded and narrow gravels there have been sorted out many tons of clean ore and the finer sands therefrom reserved for washing in the rainy season. For instance, in Devil's Basin, at the head of Texas cañon, there is a mile of winding gulch, partly covered by mammoth boulders of granite, which is credited with a production of 70 tons of tungsten ore yielding on an average 68 per cent $WO_3$, and marketed at 22.75c. per pound. This runs into a figure of nearly $32,000.

The mining has been generally of a superficial kind; so have the ore deposits. The ore has been mined in bunches where surface 'blossom' has encouraged the prospector to dig. Much of the surface ore has been decomposed by oxidizing meteoric waters and now shows in crystal casts or in the ocher-stained cavities of the more resistant quartz matrix. Scheelite is occasionally found in small seams and streaks with the hübnerite mineral.

The zone of mineralization from which the tungsten deposits have been derived occupies the higher ground at the head of Texas creek and Sheep cañon, and other lateral cañons. The extensive tunneling before referred to was done under the auspices of a Philadelphia company once operating here, and still interested in the district. The tunnels are most of them cross-cut tunnels, designed to intersect the various veins which are seen to be running with the ridge approximately N. 40° E. and having a dip of about 70° south. There is a distinct sheeting of the granite in direction N. 45° W. with dip 80° easterly. The lower tunnels disprove the persistence of these veins in depth, and the results obtained appear to have discouraged the work of the company, which was here using methods altogether incompatible with the nature of these ore deposits. Perhaps the best defined vein of this group is the Bluebird, which occupies the line of contact between granite and intrusive diorite. It is a vein which has plainly resulted from the filling of the existing fissure by quartz. The fissure follows the contact over the greater part of the distance that the vein has been uncovered, though at times the vein lies within the body of the intruded diorite dike mass. The Bluebird claim has been more productive than any other claim in the district. Its ore-shoot has been developed for 170 ft. continuously and for a height of 80 ft. to 90 ft. of 'backs.' Its bearing is N. 15° E. with dip easterly 55° to 60°. The vein occupies the hanging wall side of the dike, and while the space between walls is something like 5 ft. wide, the ore occurs in a vein from 5 to 6 in. wide only; occasional seams reach out into the country and break through the wall. The ore remaining in these workings is of low grade, possibly of concentrating grade, say from 5 to 8 per cent tungsten mineral.

The Bluebird workings indicate that the ore-shoot pitches north about 40° or diagonally to the plane of the vein on its dip. Other veins occur in the central part of this same ridge but they are of the different character before described as aplite veinlets in granite and quartz of altered granite. As the process of erosion of the mineralized granite belt of this higher ridge was proceeding, the tungsten ore, in the shape of float, has been carried down its slopes by torrential water and the heavier minerals concentrated in the wash and in the streams of the gulches below, so as to form placer deposits. These placers of tungsten ore or stream-tungsten have been worked over beginning with the turning over of the boulders and the sorting out of the lump tungsten ore to the washing of the finer sands, until to-day the gravels are practically exhausted. These gravels are generally so shallow that a heavy rain might well be conceived to bring in fresh mineral from the slopes, to make a concentration of the heavier mineral on the granite bed-rock and thus tend to replenish the ground already worked over. Of course this is only true within narrow limits, and must not be interpreted to mean that the deposit is periodically rejuvenated.

The gravel bank being worked to-day is something less than a foot deep and shows from 1 to 1.5 in. of reddish-black sand lying close on the bed-rock. The upper sand or over-burden is stripped in the usual way and the bed-rock sand kept clean. There was a time here, it is said, when a lump of tungsten mineral of 6 to 8 lb. weight, and solid mineral, was quite a common find. It is no longer so.

What is true of gold placers the world over is true of these tungsten placers, namely, that the present day source of the placer values is not sufficient to account for the richness of the original placer deposits. That this should naturally be the case is explained, here as in other cases, when there is taken into consideration the fact that there is a thickness of hundreds of feet of once superincumbent strata to be reckoned with when indulging in speculation as to the source of the richer gravels. Also there is the circumstance that this once existent overlying rock was possibly more productive of bonanza ore than anything left behind for modern view and present day mining operations. In other words, the original gravel, heavy in tungsten, represents the concentration of an immense volume of mineral-bearing rock (measurable in hundreds of thousands of tons), which has long since been disintegrated and gone into the formation of the flat land or mesa at lower levels. These particular placers are essentially gulch placers, though some short, and not extensive, strips of bench gravel exist on either side of the channel of the stream and in the laterals. They also have been worked over.

The means employed in the handling of these gravels include the hand-picking of lump ore, the use of rocker and sluices, and hand-jigs; and there have been some attempts made toward a dry concentration of the same gravels, but with no success. Dry concentration experiments have generally lacked in point of capacity and resulted unsatisfactorily. The best and most practical work has been done through the use of a rocker of a design crudely adapted to this particular work. The body of this rocker consists in a straight piece of sluice about 6 ft. long and 10 by 22 in. inside cross-section. The discharging end of the rocker is kept at a slightly higher level than the back end. The rocker is without riffle of any kind, and no screening is used on the hopper part. The man who handles the rocker uses with his other hand a piece of iron resembling half of a frying pan, with which tool he keeps raking back the partially concentrated material toward the head of the rocker until the concentrate shows about clean; that is, comes up to the 65 per cent $WO_3$ standard which his contracts have called for in the past. Rocker work was done with three men to each rocker, when the water supply was full. While one man rocked and scraped, another man fed water from the water well at the head of the machine, and a third man attended to the shoveling and charging of gravel from the bank side. With diminishing water supply, one man would have to do double duty in shoveling gravel and pouring water. With water scarce the whole thing was turned over to the mercies of one man to do what he could with it. No water, no rocking.

The gravel originally ranged from a few inches deep to extremes of 4 and 5 ft., averaging from 15 to 18 in. The granite bed-rock is occasionally found to be creviced and is then carefully scraped. Where rich gravels were found in laterals and in other places high and dry, they have been sacked and have been packed over by Mexican labor. Some gravel was carried over a distance of a half mile or more.

On the first working of these placers it was general to figure a day's work at 50 lb. of clean ore to a man, or, say, $10 per man employed. In size, the tungsten ore of the gravels has varied from a fine flour mesh to nugget sizes. What is locally spoken of as nugget, or lump ore of tungsten, has been found in pieces as heavy as 200 lb. and in the course of their operations it is claimed that the Deininger Company turned over a piece of fairly solid ore of nearly two tons weight.

Working on rich gravel the rocker device has been worked to a capacity of nearly 500 lb. per diem. This is still a very crude device, but these gravels are now so nearly depleted and are in themselves so thinly distributed that there is nothing to warrant the introduction of better and more up-to-date mechanical appliances to take up the leavings of former washings. There is a syndicate now working the placer ground tributary to the mineral zone here described, but with just what success can only be surmised. The character of these gravel deposits makes it impossible to work to any scale of operation, and there is little encouragement in following the steps and adopting nearly the same methods of the prospector, who could only have made scant money out of his crude handling of the original undisturbed gravel.

Milling has been tried in a test lot which was sent for treatment to a gold mill in the locality. This mill has an equipment of 20 stamps and three Wilfley tables and accessory machinery. The lot weighed 35,750 lb. in crude ore and yielded 4,400 lb. of tungsten ore of 69.24 per cent $WO_3$. Naturally a mill equipped for the milling of gold ores could not be readily adapted to the treatment of ores of tungsten, and the result showed in the tailings which went to waste with a little over 20 per cent $WO_3$. This would indicate a saving of less than one-third of the original tungsten contents only. Such milling might better be referred to as a loss rather than a saving.

In the placer work now going on they are screening to about 1-in. mesh, and are adopting

a combination of hand-sorting—breaking up the quartz boulders for the tungsten mineral contained within them—and are piling the fine dirt and gravel for the coming of rain water which will allow of rocking and sluicing work. The waste boulders are piled up and walled at one side.

An incident illustrating the vicissitudes of fortune in mining happened several years ago, in the first working of some of this gulch ground, when one miner bought from another a one-half interest in a certain group of claims for $227.50 or its equivalent in ore, and he in less than four months from the date of purchase produced from this ground 26 metric tons of tungsten ore which netted a profit of $10,470.

The tungsten market has fluctuated within fairly wide limits, and speaking generally there has, in the last two or three years, been no fixed market for tungsten. Prices on crude ore of concentrating grade have been almost prohibitive to mining, and concentrates have commanded from $2.50 to $3.25 per unit. Recently the market for tungsten has advanced materially, and the reason for it is thought to be due to the inability of selling agents to fill their contracts for supply. This has created a shortage in the supply of tungsten, until as high a figure as $6 per unit is just now offering on concentrates, or clean ore, which will come up to the requirement of 65 to 70 per cent tungstic acid.

The ore is contracted on basis of a 90 per cent cash payment on delivery f. o. b. cars New York, and 10 per cent of the settlement withheld for 30 days, to give time for the comparison of assay and adjustment of possible differences between buyer and seller.

## IRON AND STEEL WORKS OF THE UNITED STATES.

The American Iron & Steel Association has completed, and will shortly publish a new edition of its *Directory* of the iron industries of the United States. From the preface to this work we take the following interesting summary, prepared by Mr. James M. Swank, the general manager of the Association, who has kindly furnished us with an advance copy.

The opinion has been frequently expressed that the organization in the iron trade in recent years of many so-called "trusts," particularly of the United States Steel Corporation, would result in a serious check to individual enterprise or to the enlistment of comparatively small firms and companies in the manufacture of iron and steel. An examination of the present edition of the *Directory* will show that apparently precisely the opposite effect has been produced, or at least that the "trusts" have not interfered with the growth of our iron and steel industries under independent auspices. A surprisingly large number of independent iron and steel plants have been built in the last few years, while many old and well-established companies have greatly increased their facilities in these years for the manufacture of iron and steel. Especially has there been a marked development of independent enterprise in the manufacture of iron and steel specialties, of which steel castings may be mentioned as a leading example.

In the edition of the *Directory* for 1901 we described 406 completed furnaces as being then active or as having been reported to us as likely to be some day active. We gave the annual capacity of these furnaces as amounting in round numbers to 24,800,000 gross tons, not all of which capacity could, of course, be employed at the same time, nor would some of the furnaces enumerated ever run again. In the present edition we describe 428 completed furnaces, either active or reported to us as likely to be some day active. Eliminating some of the furnaces in the latter category, as being in our opinion dead for all time, there remain about 410 live furnaces to-day. The annual capacity of these furnaces we place in round numbers at 27,675,000 gross tons. Our actual production of pig iron in 1903 was 18,009,252 gross tons. Since 1901 we have transferred 21 furnaces to the abandoned, dismantled, or inactive list.

When the *Directory* for 1901 appeared 12 furnaces were being built, 2 in New York, 1 in New Jersey, 3 in Pennsylvania, 1 in West Virginia, 2 in Alabama, 1 in Michigan, and 2 in Colorado. In the present edition we enumerate 17 furnaces in course of erection or as being rebuilt, namely, 3 in New York, 5 in Pennsylvania, 1 in Virginia, 2 in Alabama, 4 in Ohio, 1 in Michigan, and 1 in Colorado. In the figures for both years we do not include projected furnaces or furnaces that had been undertaken and work upon which had been suspended.

The 406 furnaces described in the edition for 1901 were classified as follows: 55 used charcoal as fuel, 5 used mixed charcoal and coke, and 346 used anthracite and bituminous fuel. Of the 428 furnaces that are now described 56 use charcoal and 372 use anthracite and bituminous fuel. No furnaces now use mixed charcoal and coke. Five furnaces, not included above, make ferro-silicon, ferro-chrome, ferro-tungsten, etc., by electricity.

The average annual capacity of the 55 charcoal and 5 mixed charcoal and coke furnaces in 1901 was 14,179 gross tons, and the average annual capacity of the 56 charcoal furnaces that are now described is 15,207 tons. The average annual capacity of the mineral fuel furnaces in 1901 was 69,252 tons; in June, 1904, it is 73,286 tons.

In the edition of the *Directory* for 1901 we enumerated 527 completed rolling mills and steel works, 28 in course of erection, 1 being rebuilt, 1 to be rebuilt, and 6 projected. In the present edition we enumerate 572 completed rolling mills and steel works, 12 in course of erection, 1 being rebuilt, and 2 partly erected. In addition the *Directory* mentions 14 projected plants. The annual capacity of the completed rolling mills in 1904 amounts to 25,978,050 tons of finished rolled products, as compared with 23,220,350 tons in 1901.

The number of puddling furnaces in November, 1901, each double furnace counting as two single furnaces, was 3,251. In June, 1904, there were 3,161 puddling furnaces. The highest number of puddling furnaces reported in any edition of the *Directory* was in 1884, when 5,265 were enumerated.

The total number of completed bessemer steel works in November, 1901, including 1 Clapp-Griffiths plant, 2 Robert-Bessemer plants, and 9 Tropenas and 'special' bessemer plants, was 47, and the whole number of converters was 100. In June, 1904, there were 32 standard bessemer steel works with 75 converters, 1 Clapp-Griffiths plant with 1 converter, 2 Robert-Bessemer plants with 3 converters, 10 Tropenas plants with 14 converters, 1 Bookwalter plant with 1 converter, 1 Evans-Wills plant with 2 converters, and 4 plants with 7 converters which make steel by special processes; total number of bessemer plants, 51; total number of converters, 103. The increase in the number of small bessemer plants in the last few years is noteworthy. Since November, 1901, 6 standard bessemer plants with 15 converters have been dismantled. In addition, 2 Tropenas plants with 3 converters have been abandoned. The annual capacity of the completed and building bessemer converters in November, 1901, was 12,998,700 gross tons; in June, 1904, it was 13,628,600 tons, an increase of 629,900 tons. No basic bessemer steel is made.

The *Directory* for 1901 described 112 completed open-hearth steel plants, with 403 completed furnaces. In the present *Directory* we describe 135 completed plants, with 549 completed furnaces. In 1901 there were 12 open-hearth plants, with 40 furnaces building, 1 plant was to be rebuilt, 13 plants were projected, and 6 furnaces were being added to existing plants. In June, 1904, 5 open-hearth plants with 9 furnaces were building, 2 plants with 3 furnaces were partly erected, 17 plants were projected, and 13 furnaces were being added to existing plants. In addition, 1 open-hearth steel plant which has 4 completed furnaces had 3 furnaces which were partly erected several years ago, but upon which work had been indefinitely suspended. The annual capacity of the 549 completed and the 28 building and partly erected open-hearth furnaces, in ingots and direct castings, in June, 1904, was 11,335,100 gross tons, against an annual capacity in November, 1901, of 8,289,750 tons, showing an increase of 3,045,350 tons.

In the *Directory* we indicate the character of the product made at our open-hearth steel works, whether acid or basic steel, or both. Of the 403 completed furnaces in November, 1901, 236 were prepared to make basic steel and 167 to make acid steel, and of the 46 building furnaces 33 would make basic steel and 13 acid steel. The completed and building basic furnaces had an annual capacity of 6,415,100 tons, and the acid furnaces of 1,874,650 tons. In the present *Directory* 185 open-hearth furnaces are described as making acid steel and 364 as making basic steel; also 4 acid and 24 basic furnaces as being built or as partly erected; total, 189 acid and 388 basic furnaces. The acid furnaces have an annual capacity of 2,015,900 gross tons of ingots and castings, and the basic furnaces of 9,319,200 tons of such material.

In November, 1901, there were 45 completed crucible steel plants, equipped with 2,896 pots, and their aggregate capacity was 175,000 tons. In June, 1904, there were 57 completed plants, the number of pots was 3,606, and the aggregate annual capacity of the plants was 226,610 tons.

In 1901 there were 56 open-hearth steel plants which were prepared to make steel castings, and in June, 1904, there were 84 plants. The production of open-hearth steel castings has greatly increased since 1898. As already mentioned, the number of small bessemer plants has also increased since 1901, all of which make steel castings. Steel castings are also made by 26 crucible plants; also by a few plants which use special processes.

In the edition of the *Directory* for 1901, we enumerated 45 rolling mills which were prepared to make standard, girder, light T, and other iron and steel rails, and 3 mills as in course of erection. In the present edition we enumerate 44 completed rail mills, 1 building, and 1 projected.

The whole number of works which are now equipped to roll beams, beam girders, zee bars, tees, channels, angles, bridge rods, building rods, plates for bridge work, structural tubing, etc., is 70, as compared with 67 in November, 1901.

In the *Directory* for 1901 we enumerated 153 completed plate and sheet mills, 7 building, and 1 projected. In the present *Directory* we enumerate 157 completed mills, 2 building, 1 partly erected, and 4 projected.

In the *Directory* for 1901 there were 60 completed iron and steel skelp mills and 2 building. We now enumerate 61 completed mills and 2 projected.

In the *Directory* for 1901 we included 46 completed black plate plants, 6 building, and 1 projected. In the present *Directory* we mention 49 completed and 3 building plants.

In November, 1901, there were 55 completed tinplate and terne plate works, 7 building, and 1 projected. In the present *Directory* we enumerate 53 completed works, 2 building, and 1 projected.

In November, 1901, there were 32 completed wire-rod mills, 4 building, 1 rebuilding, and 1 projected. In June, 1904, there were 33 mills equipped to roll iron and steel wire rods.

In November, 1901, there were 32 rolling mills which were devoted in whole or in part to the manufacture of cut nails and cut spikes, containing 3,161 nail and spike machines. In June, 1904, there were 23 rolling mills which made cut nails and cut spikes, equipped with 2,302 nail and spike machines. These were located in 8 States, as follows: Massachusetts, 3; Pennsylvania, 8; Virginia, 1; West Virginia, 3; Kentucky, 1; Ohio, 4; Illinois, 2; and California, 1. In addition 1 cut-nail works was being built in Indiana, to be equipped with 102 cut-nail machines.

In the *Directory* for 1901 we named 110 completed iron and steel works which used natural gas and 7 in course of erection. In June, 1904, the total number of works which used natural gas was 135, and in addition 2 works to use natural gas were being erected, 1 works was partly erected, 1 works was rebuilding, and 2 works were projected, as follows: 54 completed in Allegheny county and 33 completed and 1 projected in other parts of Western Pennsylvania; West Virginia, 11 completed and 2 building; Kentucky, 1; Ohio, 19 completed, 1 partly erected, and 1 projected; Indiana, 16 completed and 1 rebuilding; Illinois, 1.

The number of pig and scrap iron bloomaries which made blooms, billets, etc., for sale in November, 1901, was 8, nearly all of which were active in that year. The number of forges which made blooms directly from the ore was 2. The number of bloomaries now enumerated is 8 completed and 1 building. The number of forges which make blooms directly from the ore is reduced to 1, located in New York.

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QUICKSILVER IN ALGERIA.—The quicksilver mine at Taghit, Algeria, which has been for some time under development, entered upon the productive stage in 1903. About 20 metric tons of quicksilver were exported and it is expected that the output will show a large increase during the current year. The works at Taghit are equipped with two furnaces, one a Cermak-Spirek roasting and calcining furnace of 6 tons daily capacity and the other a Spirek shaft furnace, also of 6 tons capacity. The ore carries zinc, which is recovered after driving off the quicksilver.

## THE AKRON CHILEAN MILL.

The accompanying cut illustrates the "Akron" Chilean mill designed and built by the Webster Camp & Lane division of the Wellman-Seaver-Morgan Company, of Cleveland, Ohio, which will be found of interest as embodying a number of new features. In the construction of this mill, special attention has been devoted to the following extremely important points: First, substantial construction combined with easy accessibility to the wearing parts; second, convenient means for adjusting rolls; third, evenly distributed and steady feed; fourth, large screen capacity; fifth, free discharge.

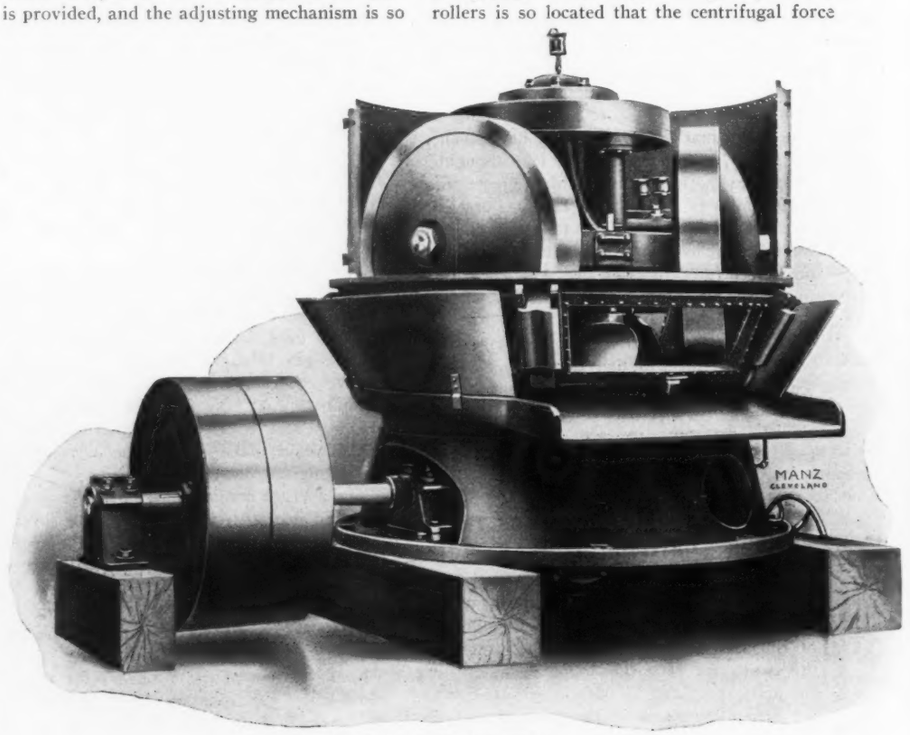
Among the noteworthy constructional features embodied in the mill are the following: Vertical adjustment of drive-head and rollers is provided, and the adjusting mechanism is so arranged that they may be lowered or raised while the mill is in operation by means of a hand-wheel, conveniently located outside of the sub-base. Hence the position of the rollers in reference to die, can be readily varied at any time, and the revolving parts can be lifted to facilitate starting the mill after being stopped with a charge in the mortar. The main drive-head is provided with roller-bearings, so placed as to receive either upward or downward thrust.

Another special feature is the efficient method of lubrication which is secured by an oil-cup located directly over center of the driving-shaft. The oil passes from this cup to a cavity in top of the shaft, and is conducted to a point directly over the outer surface of the hollow spindle, the top of this spindle being chamfered so as to form a groove between it and the inner surface of the drive-head. This groove catches the oil as it drips from the pipe, and it is then conveyed to a circular groove in the upper end of the spindle-bearing, where it is held in sufficient quantity to lubricate this bearing thoroughly. Separate provision is made for oiling the lower spindle-bearing.

Each roller bearing is provided with three grease-cups and to prevent the oil from reaching pulp which may be contained in the body of the mortar, the roller shaft is provided with lips which arrest the outward flow of the oil and direct it to cavities from which it may be readily drained. To prevent oil from working its way along the roller shaft to the inside of the rolls and thence to the mortar, an oil thrower is turned on the roller shaft which throws the oil into a cavity, whence it is drained into the inside through the bottom of drive-head.

In order to remove the pulp entirely from the mortar, a drain is provided from the inner edge of the mortar, having an outlet underneath the launder, this outlet being closed by a plug except when the mortar is to be drained.

The spindle and trunnion bearings are very large, insuring rigidity of mill and smoothness of operation. The center of gravity of the rollers is so located that the centrifugal force developed adds to the crushing effect. Increased capacity is obtained by increased size of screen opening and by making the bottom of the launder with semi-circular cross section instead of flat, thus allowing greater capacity with the same amount of water.




THE AKRON CHILEAN MILL
(Patents Pending)

The mill is under-driven and is equipped with three rollers, fitted with heavy tires of forged steel running on a forged steel die. Driving gears are of cast steel, heavy pattern. The mill is provided with tight and loose pulleys.

The housing is made in sections, held together by hinged bolts which permit a section to be thrown back without entirely removing it from the mill. The screen area is exceptionally large. All working parts of the mill are readily accessible, facilitating inspection and repair.

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A NEW AFRICAN RAILROAD.—Plans are under way for the construction of a railroad in the German colony of Togo, West Africa. The line is to be 122 km. long and will consist of two branches, one running from Lome to Kleinpopo and the other from Lome to Palime. The shipping facilities at Lome are to be improved by the construction of a wharf. The exports of the colony now amount to about $1,000,000 per year.

## A MODERN COAL CUTTER.

In most styles of chain coal undercutters used in the United States for room-and-pillar work, much of the working time is consumed in withdrawing the machine from the cut, setting and re-setting jacks and barring the machine into its next position, while the cuts may be put in at different heights, making an uneven floor, or a rib may be left between cuts.

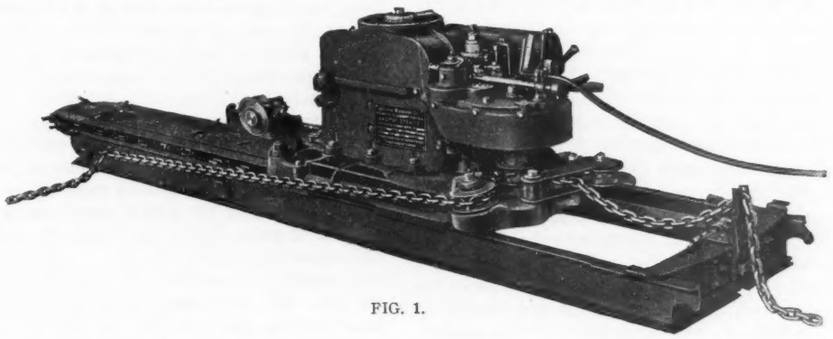

FIG. 1.

The machines, being fixed rigidly, are unable to follow closely irregularities in the bottom, and the rear jack piercing the roof at regular intervals may bring down the roof, particularly since the great length of the machines (from 10 to 13 ft.) makes close propping difficult.

The electric chain machine manufactured by the Sullivan Machinery Company consists of the following principal parts: (Figs. 1 and 2.)

1. A bar on which a link chain with steel cutters moves in a horizontal plane. 2. An electric motor driving the chain by gearing. 3. A frame on which the bar chain and motor are mounted; this frame with other main parts being mounted on another frame called the pan.

The machine itself makes the first, or "tight," cut in practically the same manner as other chain machines, except that the feeding is done by a chain instead of a rack and pinion. (Fig. 1.) After the first cut is finished the back end of the frame or pan is detached (Fig. 2), the feed chain is anchored in the left corner of the room, and the machine then is started at cutting sideways from right to left across the room, not stopping until the breast is completely undermined. The machine is loaded by its own power upon a mule, or power truck, for moving about the mine

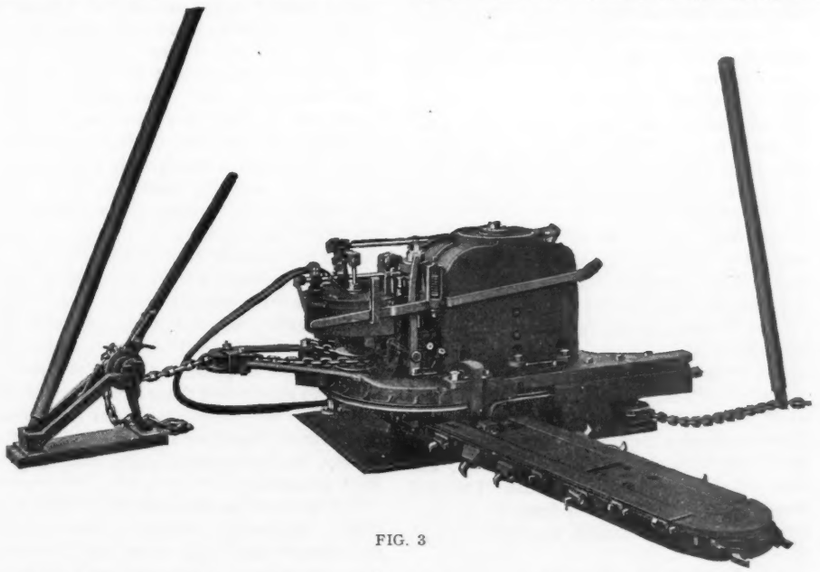

FIG. 3

The manufacturer of the Sullivan electric chain machines makes the following claims among others: Greater output of coal; less horse-power consumed per ton of coal mined—under ordinary conditions these machines are said to require about 20 h.p. while cutting and 4 h.p. while loading or unloading and moving about the mine; a higher kerf than that of other chain machines, with more nut and pea coal; no stumps or sprags left to interfere with blasting; cuts very close to the bottom, following quite sharp irregularities; timbering about 5 ft. from the working face, insuring the safety of machine men and loaders; works on any pitch up to 30° when rooms are driven across the pitch, and straight up pitches not exceeding 12°.

The motors are of the multipolar, vertical, shunt-wound, direct-current type, built for 210, 250 and 500 volts, and the machine will undercut to 5, 6 or 6.5 ft. The armature is drum-wound with formed coils, and is built on a separate sleeve, making the shaft removable. The motor, especially designed for this machine, has a ventilating fan and also ball-bearings. The reverse switch is interlocking, and the current cannot be reversed when the machine is in operation. The rheostat is made of laminated iron punchings with mica insulation, and is said to be practically indestructible from burn-outs and grounds.

The main frame and pan support the motor, gearing and cutter bar, and are connected by gibs. The feed mechanism is driven by a friction clutch adjustable by spring and nut, which slips when unusual strain is brought upon the cutter chain, as when sulphur balls are encountered.

The new type cutter chain is of the link and strap pattern, with very liberal dimensions, running in close gibbed guides. The steel cutters have seven positions. This type of chain is found to be economical of power, particularly in hard coal, as the coal is actually cut instead of broken, giving also a high percentage of nut or lump coal. The speed of the machine varies from 14 to 50 in. per minute, depending on the hardness of the coal, and feed gears are supplied accordingly. Eighteen inches per minute is an average speed.

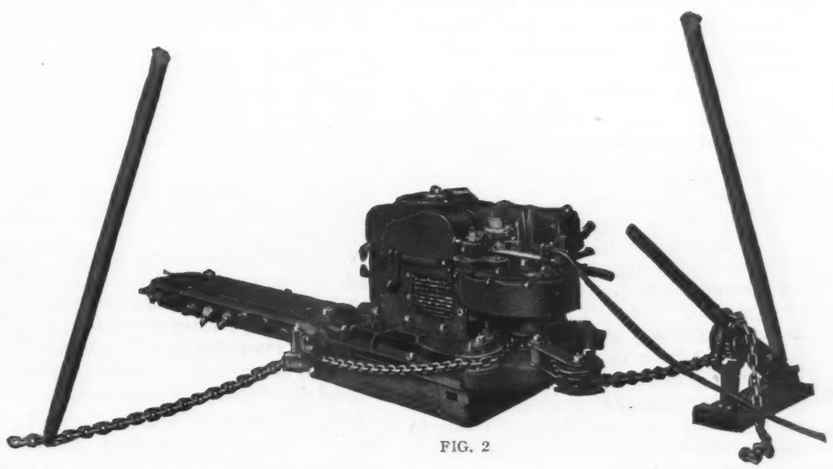

FIG. 2

The power car is very simple in construction and is operated by clutches and a sprocket chain. In the mine of the Vesta Coal Company, Allenport, Pa., where the coal was medium soft, the depth of cut being 6 ft.; height of coal, 8 ft.; average horse-power consumed by machine, about 9.25 h.p.; feed, 21 in. per minute; pull on feed chain, about 3,200 lb.; the time required for unloading and placing the machine (average of 5 rooms, 28 to 31 ft wide) was 4.5 min.; for detaching pan and setting jacks, 4.3 min.; cutting face of room, 0.18 min.; loading, 7.6 min.; moving to next room, 6 min. (distance 215 to 650 ft.); average time for cutting room, 45 min.; average net tons cut, 52.6. In seven rooms and a 9-ft. entry the machine, in 5 hours and 43 min. cutting time, made a total cut of 216 ft., undercutting 377 tons. It also undercut eleven 30-ft. rooms in a 7.5-hour shift.

To meet the growing demand in the United States for a longwall mining machine, the Sullivan electric chain machine has been modified for longwall conditions. The cutter bar is placed at right angles to the main portion of the machine, and so arranged as to be swung

in line with the machine when it is desired to load the latter on a truck. The cutter bar may, if desired, be also swung while changing bits or to avoid obstructions in the coal.

As will be noticed from the illustration (Fig. 3); the machine slides along the floor of the mine on a sheet steel shoe, and requires no rails; it will work in little space both as regards height and distance between face and props. The advance or feed of the machine is effected by a driving sprocket engaging with a chain securely fastened some distance ahead of the machine, and stretched parallel to the face. As the machine advances, the slack in the chain is taken up by the back chain; thus the machine is always kept up to its work and at the proper angle to the face of the coal. Should it be necessary to alter the angle of the machine with the face, the tension on the chain may be changed by the ratchet and the machine made to assume any desired angle. This cutter is driven by electricity. The motors are wound for 210, 250 and 500 volts direct current, and the machines are built to undercut up to 5 ft. deep. It may be added that one of these machines has a record of 500 ft. with a 5-ft. undercut in an 8-hour shift, in very hard coal, in the mines of the Bolen-Darnall Coal Company, at Craig, I. T., in a vein pitching 24° on an average.

## SAULT STE. MARIE CANAL TRAFFIC.

The report of Sault Ste. Marie commerce kept by the superintendent of the canal shows a greatly reduced movement in the present year. While last year 17,224,362 tons of freight were moved up to August 1, only 9,198,203 tons were moved the present year, a decrease of 8,026,159 tons. The total movement through the canal during July was 5,609,079 tons, which, of course, is a heavy record for a single month. The falling off of shipment is, as is well known, due to the late opening of navigation, which did not begin this year until June 15, owing to trade conditions and the strike of the Masters and Pilots' Association.

The total number of vessels passing through the canal this year to August 1 was 5,419; and the total freight was: East-bound, 6,356,669 tons; west-bound, 2,841,534; total, 9,198,203 tons. The mineral freight included in this tonnage was as follows, the figures being in short tons, except salt, which is given in barrels:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| Anthracite | 431,165 | 359,768D. | 71,397 |
| Bituminous | 3,137,871 | 1,208,211 D. | 1,829,660 |
| Total coal | 3,569 036 | 1,667,979 D. | 1,901,057 |
| Iron ore | 11,191,107 | 4,963,739 D. | 6,227,368 |
| Pig and manuf. iron | 69,267 | 60,079 D. | 9,190 |
| Copper | 43,945 | 34,033 D. | 9,912 |
| Silver ore | ..... | 919 I. | 919 |
| Building stone | 4,590 | 4,227 D. | 363 |
| Salt, bbl. | 208,674 | 169,258 D. | 39,416 |

It will be seen that there was a decrease in almost every item. The average cargo reported this year was 1,698 tons.

Several concerns in this country, notably the Illinois Steel Company, use slag as an ingredient in true portland cement, the product being the same as what is called in Germany "eisen portland cement," it being understood, of course, that the term portland cement can be correctly applied to any material having the same chemical composition and made in substantially the same way as ordinary portland cement, the sources of the ingredients being immaterial.

## RECENT LITERATURE ON ECONOMIC GEOLOGY.—XXVI. IRON AND MANGANESE ORES.

By Edwin C. Eckel.

*Iron Ores of the Redding Quadrangle, California.* By J. S. Diller. *Bulletin* 213, United States Geological Survey; pp. 219-220.

Brief account of certain magnetite deposits in Northern California, occurring along the contact between Carboniferous limestone and intrusive diabase. These ores, which are usually porous and limonitic on the outcrop, are at present used only as flux at local smelters.

*Iron Ores of the Cartersville District, Georgia.* By C. W. Hayes and E. C. Eckel. *Bulletin* 213, United States Geological Survey; pp. 233-242.

Specular hematite and brown hematite (limonite) occur in the Cartersville district, the latter ores being by far the more important producers. The brown hematite deposits are classified, according to origin and occurrence, in four groups. These are: (1) Gossan ores, derived from the oxidation of bodies of pyrite; (2) Tertiary gravel ores, deposited as bog ores in low level areas during the periods of Tertiary base-levelling; (3) concentration deposits, due to the concentration of iron-bearing solutions and deposition in limestones overlying impervious strata, and (4) fault deposits.

Descriptions of the more important ore deposits are given, as well as notes on the character and compositon of the ores.

*Origin of the Oriskany Limonites.* By J. E. Johnson, Jr. Engineering and Mining Journal, vol. 76; pp. 231-232.

A valuable paper calling attention to the mode of occurrence and probable origin of the so-called "Oriskany" limonites of Longdale, Va. The author states these ore deposits probably are due to the replacement of the Helderberg limestone, and not, as previously supposed, to original deposition in Oriskany time.

*Mineral Deposits of Santiago, Cuba.* By H. Souder. Advance reprint from *Transactions* American Institute Mining Engineers; 14 pp. 1904.

Brief description of the manganese, iron and copper resources of the vicinity of Santiago.

Manganese is at present produced by three distinct groups of mines—the Ponupo, Boston and Ysabelita. At the Ponupo group the ore is chiefly pyrolusite, embedded in clay. Log washers are used to raise the grade of ore shipped. A number of analyses of Santiago manganese ores show 44.63 to 56.89 per cent metallic manganese; 0.30 to 2.42 per cent metallic iron; 0.03 to 0.07 phosphorus.

The iron ores of the district occur at the summit of a range of foothills east of Santiago. The principal ores are magnetite and red lematite. Four groups of mines are worthy of note, located respectively near Juragua, Berraco, Sigua and Guamà. An average analysis of the Juragua ore showed 60.51 per cent iron, 9.79 per cent silica, 0.328 per cent sulphur, and 0.028 per cent phosphorus. Two samples of Berraco ore gave respectively 65.1 and 68.05 per cent iron, 0.065 and 2.49 per cent silica, and 0.036 and 0.042 per cent phosphorus. The total amount of iron ore shipped from this district from 1884 to 1902, inclusive, was 5,750,592 long tons.

Adobe is a brownish or yellowish culcareous clay of fine grain and porous character. It forms the soil of a large portion of the arid region of the United States.

## BOOKS REVIEWED.

*Facts About Peat, Peat Fuel and Coke.* By T. H. Leavitt. Boston, 1904; Lee and Shepard. Pages, 115.

The title of this little book may give the impression that the author has written a technical treatise. Indeed, on the title page appears 'Facts about peat, peat fuel and peat coke, how to make it and how to use it, what it costs and what it is worth.' As a matter of fact, the book contains references to peat culled from many sources, some more reliable than others; states that the author has had experience in making what he chooses to call condensed peat, and has made peat coke, and concludes with an appendix containing extracts from newspaper articles referring to a book published by the author years ago, and now out of print. The author states that peat fuel can ordinarily be produced in good shape and marketable condition for less than $2 per ton. He also states that parties now manufacturing peat coke say that the cost of producing that article is less than $3 per ton. Briefly the author has written neither a good trade catalogue nor a technical treatise on peat fuel. It is simply a eulogy of the virtues of peat, containing some of the assertions that the author would probably admit were hastily written. There is plenty of peat in North America; some day great quantities of it will be used, but with bituminous coal selling for less than 75c. per ton at the mines the demand for peat fuel in our large manufacturing centers is not likely to be heavy.

*Geological Survey of Ohio. The Occurrence and Exploitation of Petroleum and Natural Gas in Ohio.* By John Adams Bownocker. Columbus, Ohio; published by the Survey. Pages, 320; with maps.

The late Edward Orton, during the year that he directed the work of the Ohio Geological Survey, rendered services of high value. Not only did his views on the genesis of natural gas and petroleum gain recognition from geologists in many lands, but his uncompromising opposition of the opinion advanced by promoters and held by many people who had no precise knowledge of the processes of nature—that the gas and petroleum supplies were inexhaustible, helped vastly in creating a proper regard among thinking men for the similar resources of other States, even though his positive statements were too little heeded in the scramble for wealth. The present State Geologist, in his letter of transmittal in this report, states that there is good reason for believing that the State's supply of oil and gas is short-lived, many important fields having been rapidly exhausted and it is important that complete and detailed reports of discovery and use shall be preserved. This report is intended to supplement those issued in 1886, 1888 and 1889. Mr. Bownocker, who is professor of inorganic chemistry at the Ohio State University, has been three years compiling the facts presented.

The bulletin, the first of a new series, contains a historical summary of the status of the Survey since 1893, when the last report was published; the work planned by the new geologist; a list of former publications, etc. It has five chapters dealing with the oil and gas producing rocks of Ohio; the Trenton limestone, the Clinton formation and the carboniferous rocks as sources of oil and gas,

and the origin of oil and gas and the geological conditions under which they are found. The Trenton limestone is by far the most important of the producing rock formations, but the occurrence of oil and gas in it were discussed so exhaustively by the late Edward Orton that the chapter dealing with the formation in the present bulletin is largely a review. The author has given admirable summaries of the discovery and development of the pools in this and in the other formations named, including the formation of companies, terms of leases, methods of transportation, etc. The location and extent of the important fields developed is shown by maps.

Mr. Bownocker says of the origin of gas and oil, that few questions relating to economic geology are more difficult to answer, and that at present it is impossible to say with certainty how these fuels have been formed. Though gas is found always where oil is secured, oil is not a necessary accompaniment of gas, but both have probably been derived from the same substance in the same general manner. The author takes ground against the chemical theories of origin advanced by Bertholet, Mendeljeff and others, pointing out that the theories appear to require great heat, while the oil-fields of the Mississippi basin have been singularly free from igneous intrusions, and the physical condition of the rocks now containing oil, shows they were never highly heated. nor, owing to intervening impervious strata of great thickness, could they have received supplies from below. Moreover, oil and natural gas are not found in igneous rocks.

The geological theories of origin have but one point in common—that organic matter was the source. Mr. Bownocker briefly reviews the theories advanced by Engler, Peckham, Newberry and Orton, and gives prominence to a bacterial theory advanced by Charles B. Morrey, of the Ohio State University, who believes that petroleum of the Pennsylvania type and gas in similar situations were found in the mud of which shales were composed, from the time the mud was first deposited, by the decomposing action of the bacteria on the organic matter therein, and the formation continued until the bacterial action stopped. This action could go on at great depths, as experiments show that bacterial action is not prevented by a water pressure corresponding to a depth of 15,000 ft. of water. As to whether the oil and gas were formed in the rocks in which they now occur or from organic matter in rocks lying beneath, the majority views seem to favor the latter origin.

These geological conditions under which gas and oil are found have been advocated strongly; a porous reservoir-rock, an impervious cover, and a rock structure that will permit the accumulation of oil and gas from relatively large areas into smaller ones. As to the third condition, commonly known as the anticline, Mr. Bownocker points out that while it is very generally accepted by geologists and important reservoirs have in many cases been located by its application, yet all Ohio oil or gas-fields cannot be said to be associated with anticlines, though the reverse has not yet been conclusively demonstrated. The recent discoveries on the Texas-Louisiana coastal plain, particularly the Beaumont field, also appear to oppose the anticline theory.

If forthcoming bulletins of the survey attain the excellence of this one, the Ohio Survey will maintain the best standards of its useful past.

## BOOKS RECEIVED.

**In sending books for notices will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in a subsequent issue of this JOURNAL.**

*Types and Details of Bridge Construction. Part I. Arch Spans.* By Frank W. Skinner. New York; the McGraw Publishing Company. Pages, 296; illustrated. Price, $3.

*United States Geological Survey. Production of Asphalt and Bituminous Rock in* 1903. By Edmund Otis Hovey. Washington; Government Printing Office. Pages, 16.

*The Mineral Structure of the Victorian Rocks.* By James Stirling. Melbourne, Victoria; the Geological Society of Australia. Pages, 32.

*Hoisting in Deep Shafts.* By Charles W. Comstock. Denver, Colo.; published by the Colorado Scientific Society. Pages, 28.

*Geological Commission of Finland. Nyslott Section.* By Hugo Burghell. Helsingfors, Finland; published by the Commission. Pages, 136; with maps.

*Core-Drilling in Nova Scotia.* Prepared for the Mines Department by D'Arcy Weatherbee. Halifax, N. S.; Public Printer. Pages, 44; illustrated.

*Geological Survey of Tasmania. Report on the South Mount Victoria Mining Field.* W. H. Twelvetrees, Government Geologist. Hobart, Tasmania; Government Printer. Pages, 24.

*The Geology of the Marico District.* By Frederick H. Hatch. Johannesburg, Transvaal; reprinted from *Transactions* of the Geological Society of South Africa. Pages, 8; with maps.

*Biological Laboratory of the Philippines. A Fatal Infection by a Hitherto Undescribed Chromogenic Bacterium.* By Maximilian Herzog. Manila, P. I.; Bureau of Public Printing. Pages, 16; illustrated.

## CORRESPONDENCE.

**We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.**

**Letters should be addressed to the Editor.**

**We do not hold ourselves responsible for the opinions expressed by correspondents.**

### *The Joplin Zinc Region and Western Competition.*

SIR.—From some recent remarks in the JOURNAL, I think you are inclined to attach a good deal of importance to the competition of Colorado and other regions in the zinc ore market. Without questioning your conclusions, I would like to reflect the belief of the Missouri producers, and to make a plain statement of our side of the situation. In the first place, the zinc ore output of the Joplin district—amounting last year to 234,000 tons—is equivalent, approximately, to 117,000 tons of spelter. Placing last year's consumption of spelter at 160,000 tons, leaves 43,000 tons to be supplied from other sources. If it is supplied by the Western product it will take four tons, at least, of ore to produce one ton of spelter, or approximately 172,000 tons of ore.

The output of the Missouri mines cannot be expected to be materially increased—it cannot even be maintained, unless the assay basis remains at $35 per ton. This is indisputable. It must also be conceded that the West has an unlimited supply of zinc ore, as has also Mexico. The question resolves itself into whether the Missouri product is or is not worth enough to maintain the price necessary to keep the output at the maximum. The Missourian believes it is.

The question of most importance at issue is a metallurgical one; and upon this hundreds of thousands of dollars are being spent to solve the problem of separation and extraction, in reference to the Western product. It may be that a fund, to defray the expenses of these metallurgical tests, was raised by watered stock or the sale of bonds, but it must, nevertheless, ultimately come out of the sale of the metal; and when this final accounting is made it will be found that the dressing and smelting of the Western product will necessitate as high or higher prices for spelter.

This statement would be hard to prove, for the reason as set out above, that the metallurgical tests are being made from a fund set apart for that purpose, and this cost is not added to the current cost of ore dressing. The same rule applies to the smelting, at least in some instances. One company tries to recover the values, or by-products, in the refuse from the smelters and others throw it away, yet those values are a part of the first cost of the ore.

I think you underestimate the value the Missouri producer places upon the Western product, or rather, from the Missourians' point of view, overestimate the Western situation. The Joplin miners are not underestimating the effect of possible competition from the West. They do not, however, regard such competition as threatening enough, so far, to make a material difference in the ore situation.

MISSOURI MINER.

Joplin, Mo., Aug. 7, 1904.

### *Funds for Cripple Creek Non-Union Miners.*

Sir.—In the issue of the JOURNAL for August 4, I notice Mr. B. B. Lawrence's letter in regard to raising money for the Cripple Creek non-union miners. As a member of the Relief Committee, I wish to say that anything that is done in this direction by him and other Eastern people will be deeply appreciated by all interested. We have already raised nearly $10,000. This money will be given to the men who lost their legs in the Independence depot explosion, and the needy relatives of those killed. There are four men who must go through life hopeless cripples, and a number of persons who are left in a pitiful condition by the death of fathers or sons.

I thank Mr. Lawrence for his letter, and you for publishing it. F. M. KURIE.

Victor, Colo., Aug. 8, 1904.

PROTECTION OF IRON PIPE.—Albion S. Howe, of San Francisco, recommends that iron pipe be dipped in liquid asphaltum, rather than coal tar and pitch. The variety of asphaltum obtained as a by-product from the California oil wells is cheap. Pipe thus coated was laid for conveying salt water and after six years was found to be still bright, not having been attacked either inside or outside. Hot asphaltum is superior to the paints made by dissolving oil-well residuum in carbon bisulphide, but is not so convenient for retouching iron-work, where a previous coating has been abraded. Asphaltum is a good insulator, is unaffected by acids and is useful for covering surfaces of iron, wood or concrete.

## ABSTRACTS OF OFFICIAL REPORTS.

*Wolverine Copper Mining Company.*

This company operates a copper mine in the Lake Superior district in Michigan. The report is for the year ending June 30, 1904. The earnings and expenses for the year were as follows:

| | Amount. | Per lb. Copper. |
|---|---|---|
| Copper produced | $1,185,746 | 12.75 |
| Interest | 6,679 | 0.07 |
| Total receipts | $1,192,425 | 12.82 |
| Expenses at mines | $495,655 | 5.33 |
| Smelting, freight, etc. | 105,033 | 1.13 |
| Construction | 34,497 | 0.39 |
| Total expenses | $635,185 | 6.85 |
| Net earnings | $557,240 | 5.97 |

The surplus from previous year was $452,791, making a total of $1,010,031. From this two dividends, amounting in all to $390,000, were paid; leaving a balance to current year of $620,031. The total copper produced was 9,300,695 lb. The statement of assets shows: Cash, $375,665; copper and copper bills, $206,957; cash and supplies at mine, $25,433; accounts receivable, $312; stock in Michigan Smelting Company, $70,400; total, $678,767. Bills and accounts payable were $58,736, leaving a balance of $620,031, as above.

A summary of the results for the year is as follows:

| | |
|---|---|
| Rock hoisted | 328,412 tons. |
| Rock stamped | 314,091 " |
| Mineral saved | 12,152,590 lb. |
| Refined copper | 9,300,695 " |
| Refined copper per ton stamped | 29.61 " |
| Cost per ton of rock stamped | $1.58 |
| " " " " hoisted | 1.51 |

The refined copper was 76.53 per cent of mineral saved; or, 1.48 per cent of rock hoisted. No. 3 shaft was sunk 251 ft. to the 26th level, and No. 4 shaft 218 ft., to the 22d level. The levels and cross-cuts made were 4,918 ft. in all; stoping, 19,849 fathoms.

The agents' report says: "The principal item of construction at the mine was the erection of an addition to No. 4 boiler plant by the installation of a 200-h. p. Stirling boiler together with Green fuel economizers and a 120-ft. self-supporting stack, completing a plant which will meet all future requirements at this end of the mine.

"Other construction at the mine was the building of a coal trestle at No. 3 plant, and the purchase of one dwelling. At the mill the construction consisted of buildings covered intake crib at the pumping plant, in conjunction with the Mohawk Mining Company to avoid any possibility of hindering the water supply for the mill during the severe Winter weather and the erection of a 6-ft. Chilean mill to grind the raggings from the tails of the rough machines, and any other material that cannot be successfully concentrated by the usual methods.

"Our reserves of stoping ground are fully as large, and of as good quality as in the past year, and promise satisfactory returns for the year to come."

President John Stanton's report says: "The question of providing more favorable arrangements for smelting our mineral has been under consideration for some time past, and we are now able to report that this company has associated with the Champion, Trimountain, Baltic, Mohawk and Atlantic mining companies—all closely allied in management—in the formation of the Michigan Smelting Company, with a capital of $500,000, which company has secured an eligible site on the shore of Portage Lake and has erected thereon a smelting plant of modern construction, equipped with every convenience for conducting the business in the most efficient manner. This plant has commenced work successfully and will shortly be in full operation. The entire capital stock of the smelting company has been subscribed for by the companies named in proportion to the amount of mineral produced by each, thus assuring an equitable division of the benefits arising from this co-operation. The sum of $70,400 has been paid during the year on account of the subscription to this stock, leaving a balance of $9,600 to be paid during the coming year.

"There is no change of importance to note in the condition and prospects of the mine."

*Pocahontas Colliery Company.*

This company owns valuable coal lands in the Pocahontas district, on the Norfolk & Western railroad. The report is for the year 1903. Owing to legal difficulties encountered in the formation of the company, it was found necessary to have two companies, the Pocahontas Collieries (of Virginia), which has $1,200,000 capital stock, all owned by the Pocahontas Collieries Company (of New Jersey), the latter having $3,000,000 common and $1,500,000 preferred stock.

The statement of the New Jersey company shows receipts of $220,998, of which $216,000 came from dividends on Virginia company stock. Payments for taxes, interest and sinking fund amounted to $88,218; dividend on preferred stock, $90,000; a total of $178,218, leaving a surplus of $42,780.

The statement of the Virginia company shows net earnings from operation, $483,849. Taxes and depreciation amounted to $31,785, and dividends to $216,000; a total of $247,785, leaving a surplus of 236,064. Adding $276,920 brought forward from 1902, made the total surplus $512,984 at the close of the year.

President Charles S. Thorne, of the Virginia company, says in part: The operations of this (Virginia) company for the year 1903 have been most gratifying.

In addition to payment of fixed charges and full dividends on preferred stock of the New Jersey company, sufficient funds have been provided from the earnings to carry on the improvements to the property which were undertaken, and there were completed from these funds 116 new coke ovens, making a total of 800 ovens; also 50 new dwellings, making a total of about 350 dwellings. The new steel tipple is also well under way, and the entire plant has been greatly strengthened and improved, being in better condition now for handling a large output than at any time in the past. Immediate benefits have been derived from this policy of improvement, resulting in a greater output of coal in 1903 than in any recent year, the production being 763,604 net tons.

With the completion of the 116 coke ovens erected in 1903, making 216 new ovens constructed within the past 2 years, the company has fully complied with the oven requirement of the old leases. No further expenditure will be required for this purpose at the present plants, and the 800 ovens which we now have will be sufficient for the coking purposes of these plants. With the exception of the new steel tipple at the Baby mine, all other improvements undertaken have been completed; and while the new steel tipple is well under way, the work on this structure has not been pushed, owing to a very severe winter, and to the temporary curtailment by the Norfolk & Western Ry. of improvement work for the handling of an increased coal tonnage. This tipple will, however, be completed during this summer in time to meet any increase which may be provided in the carrying capacity of the railway company, should their improvements for this purpose be resumed this year.

On January 1, 1903, an advance of over 10 per cent in wages was voluntarily made, which was maintained until after the end of the year, when, owing to reductions in the prices of coal and coke, it was found necessary to re-adjust wages on February 1, 1904, to the rates that had been in effect prior to this advance, and the mines are now being operated under these revised rates. A material saving has been made for the future in the expense of handling the coal sales by obtaining a reduction in the rate of commission paid to our sales agents equal to several cents per ton. A more permanent arrangement has also been effected for selling the coal by entering into a five-year contract with them. Conditions have been further strengthened by a fuller agreement among the operators in the Pocahontas field to market their coal through a joint sales agent, thus lessening competition to sell the coal.

It is not expected that the high prices received last year for coal and coke can be obtained for the year 1904, but the indications are for a good demand at fair prices.

## QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc. preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

*Graphite.*—Kindly advise me if the mineral I send you is graphite and has any value.—W. D. G.

*Answer.*—The specimen appears to be a rather impure form of amorphous graphite. It would probably have some value, if the impurities—quartz and mica—could be removed. The separation of graphite and mica is, however, a difficult matter, especially when both minerals are 'scaly,' as in this case. Amorphous graphite is used extensively for paint, foundry facings, manufacture of lead-pencils, etc., but is less valuable than the crystallized variety. It commonly brings from $5 to $20 or more per ton, according to quality.

*Potassium Cyanide.*—I should like to get some information on the manufacture of potassium cyanide, particularly in regard to the processes used and the feasibility of making it in the United States. What are the resources of this country in potash, and where are they situated? Kindly direct me to literature dealing with subject.—K. R. T.

*Answer.*—There has been very little published on the manufacture of potassium cyanide, as the industry is closely controlled by the American and foreign producers. You will find the most comprehensive articles that have been published so far in 'The Mineral Industry,' Vol. IV, VI and X. Various methods are employed based on the conversion of ferro-cyanides or sulpho-cyanides, the utilization of cyanide from gas works, or the combi-

nation of atmospheric nitrogen with barium carbide, but they are too involved to be discussed here. A plant was erected recently at Niagara Falls to manufacture cyanide by an electric process. There is practically no production of potash in this country. The German mines supply the greater part of the world's consumption of potash salts.

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*Platinum.*—In mining for gold I have run across a deposit of black magnetic sand which contains a grayish mineral, or metal, locally pronounced to be platinum. I have saved this sand and desire to have it assayed. Will you kindly recommend a reliable assayer and also give me some information as to the methods that should be used for concentrating the material?—F. W. S.

*Answer.*—Unless the mineral is present in minute grains, you can determine with approximate certainty as to whether or not it is platinum. The lighter material or silicates, if present, can be removed from the sand by the usual methods of washing, and then the black magnetic mineral can be separated by a magnet. In the concentrate you should have the gold, platinum and other heavy metals of the platinum group. If the gray metal is malleable, but insoluble in ordinary acids—hydrochloric, nitric or sulphuric—it is almost certain to be one of the platinum metals. Any of the assay firms that advertise in our columns can be recommended as competent to assay the material for you. For concentrating the sand, some form of the magnetic separator will have to be used. There are several types of these machines on the market, and we think you will have little trouble in finding one suitable for your purpose.

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## RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DUTY ON AGATE AND ONYX—PRECIOUS STONES.—Agate and onyx, precious stones of the kind usually employed in the manufacture of jewelry, dealt in under the specific names of jasper, tiger-eye, brown sard (onyx), and carnelian, are dutiable at 10 per cent under paragraph 435, act of July 24, 1897, and not as manufactures of agate and onyx under paragraph 115. Appeal of Lorsch & Co. from Collector of Customs at New York; Board of General Appraisers.

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WHAT MUST BE DONE UNDER RE-LOCATION IN MONTANA.—The law of Montana declares (Code, section 3615) that the re-location of an abandoned lode or placer claim must be made by sinking a new discovery shaft and fixing new boundaries in the same manner as if an original location was being made, or the re-locator may sink the original shaft 10 ft. deeper, in which case the declaratory statement shall give the depth and dimension of the original discovery shaft at the date of the re-location, and failing to do this the re-location is invalid. The validity of a mining location, in an action to determine an adverse claim before patent issued, must be determined by the law in force at the time the location was made. In such action, if neither party is entitled to a patent, the court must so find.—Wilson v. Freeman. (75 *Pacific Reporter*, 84); Supreme Court of Montana.

## PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared.

*Week Ending August 9, 1904.*

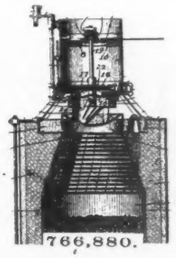
766,817. ELEVATING AND DUMPING PLATFORM.—Michael H. Flannery, Brooklyn, N. Y. In a system of loading, a derrick, the boom-sweep of which is in apposition to both a driveway and loading-point, together with an elevating-platform adapted when lowered, for the passage of carts thereon, connections suspending the said platform from said boom, and means for elevating platform, swinging the same and the boom to a position above the loading-point, and discharging said load.

766,834. ARTIFICIAL FUEL.—Dorothea Markfeld, Homestead, N. J. An artificial fuel, consisting of a compacted mixture of comminuted dry vegetable garbage, coal-dust and other combustible matters, fatty waste, lime, cement, crude carbolic acid, and lampblack.

766,850. WATER-GATE.—William A. Smith, Carmack, Ky. A water-gate comprising a horizontally-disposed beam, supports therefor, a horizontally-disposed rod positioned adjacent to said beam, series of strips having slotted portions which are pivotally mounted upon said rod, bracket-arms secured to said beam and adapted to hold said strips against lateral movement upon said rod.

766,854. TRAM-CAR.—Daniel Townsend, Denver, Colo. The combination with the car-axles, of a frame located above the axles, a platform mounted on the frame, boxes embracing the car-axles, the latter being provided with parts polygonal in cross-section which parts the boxes are made to fit, and bolts passing through the said boxes, the frame and the platform, and suitably secured in place, to form a structure relatively stationary with the axles of the car, one part of each box projecting upwardly outside of the frame and outwardly over the hub of the wheel to form a shield or guard.

766,880. GAS-PRODUCER.—Jerome R. George, Worcester, Mass., assignor to Morgan Construction Company, Worcester, Mass. In a gas-producer, the combination with a heating-chamber provided with an


766,880.

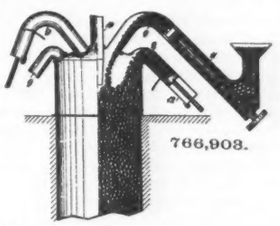
opening in its top for the admission of coal, of a coal-reservoir located above and over said opening and having an opening in its bottom for the delivery of coal, a rotating coal-distributer between said reservoir and the producer-chamber, said distributer consisting of a hopper-shaped spout with its upper or admission end concentric with its axis of rotation and of greater area than its lower or delivery end which is eccentric to said axis of rotation, with the inclined side of said hopper-shaped spout at an angle to a vertical plane whereon coal will flow freely by the force of gravity alone.

766,888. EXCAVATOR.—John H. Miller, Kansas City, Mo. An excavator comprising a frame, a crane mounted at one end thereof, a shovel carried by the crane, and one or more traveling conveyors leading from the shovel to the rear of the frame for receiving and conducting the material from said shovel to the rear end of the machine.

766,893. PROCESS OF MANUFACTURING ARTIFICIAL MARBLE.—Franz Oliva, Malstatt-Burbach, Germany. A process of manufacturing artificial veined marble which consists in intimately mixing anhydrous sulphate of alumina and anhydrous sulphate of lime, adding water to the mixture of the two materials to convert it into a stiff plastic mass, subdividing the entire mass into any suitable number of separate parts, arranging the said parts in any desired manner, sprinkling dry coloring-matter over and between the said parts, and then pressing the parts together without substantial mixture.

766,898. HORIZONTAL COKE-OVEN.—Heinrich Poetter, Dortmund, Germany. A horizontal coke oven, comprising partition-walls forming gas-distributing channels, nozzles adapted to lead the heating-gases to the combustion flues, air-flues, openings for the passage of said air, spaces and annular passages between said nozzles and the ceiling, said passages being adapted to lead the air to the combustion-ports in order to be mixed with said heating-gases.

766,903. CHARGING DEVICE FOR FURNACES, GAS-GENERATORS, ETC. Arpad Ronay, Budapest, Austria-Hungary. A charging device for a furnace, comprising a bent charging-tube having a

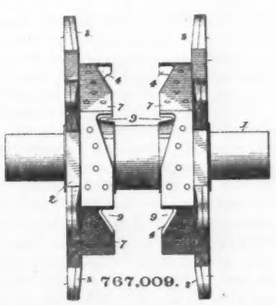

766,903.

branch connected with the furnace, and a mechanical charging device in the other branch of the tube, the arrangement being such that the fuel in the bent elbow portion of the tube closes the same to prevent the escape of gas and also protects the mechanical charging device against the heat of the furnace.

766,938. PROCESS OF MAKING BRICK.—Orvis G Diefendorf, Watertown, N. Y. A process of making bricks which consists in mixing the ingredients including cement and a small quantity of water; then forming the bricks in suitable molds; then subjecting the material in the molds to a pressure of two thousand pounds on the square inch or thereabout, thereby causing the small quantity of moisture contained to come to the surface of the molds; then removing the bricks from the molds and allowing them to stand exposed to the air till a thin hard crust is formed on their surface; then wetting the bricks; then allowing the bricks to stand and harden.

766,956. EXCAVATING APPARATUS.—John Lennon, Minneapolis, Minn. An excavating apparatus comprising a receiving-truck and a transmitting-truck, said receiving-truck having means for supporting a load, and having its truck-frame constructed to permit said transmitting-truck to be run completely through the same, below the load, supported thereby.

767,009. TUMBLER FOR GOLD-DREDGING MACHINES.—Oscar B. Perry, San Francisco, Cal. A tumbler for dredging-machines and the like, having its


767,009.

bearing-faces shaped to conform to the bearings of the buckets, and provided with flaring openings through which boulders and other obstructing matter are forced to clear the tumbler.

767,027. AIR COMPRESSION AND UTILIZING DEVICE.—Melville C. Wilkinson, Los Angeles, Cal. In an air-compression system, the combination with a compression-cylinder provided with an induction and an eduction port at either end thereof, a high-pressure reservoir connected with the eduction-ports, a low-pressure reservoir connected with the induction-ports, a controller with which the reservoirs are connected, and a pipe extending between the connections of the reservoirs and cylinder, of a pressure-operated valve in

the pipe, a check-valve in the connection leading from the low-pressure reservoir to the cylinder and a quick-acting valve located in said connection, pneumatic mechanism for operating the valve, the pneumatic mechanism set to operate only when a predetermined pressure is reached.

767,054. COMPOSITION FOR BRICKS FOR BUILDING PURPOSES.—Hiram M. Hanmore, Los Angeles, Cal. A composition for bricks for building purposes comprising diatomaceous earth, calcic oxide and aluminum clay in which the calcic oxide is in excess of the clay and the diatomaceous earth is in excess of the calcic oxide.

767,065. METHOD OF PRODUCING PLASTER-OF-PARIS.—William A. Kōneman, Chicago, Ill. A method of producing plaster-of-paris from gypsum-rock, which consists in crushing the rock, then subjecting it to heat whereby the gypsum constituent is calcined and dehydrated to the desired degree, thne subjecting the mass to further disintegration, thereby reducing the gypsum constituent to a fine powder and leaving the other constituents in a coarser state, and then sifting off and saving the gypsum constituent.

767,090 and 767,091. WOOD-DISTILLING APPARATUS.—Bartholomew Viola, New York, N. Y., assignor of one-half to Richard G. G. Moldenke, Watchung, N. J. An apparatus for distilling sawdust and similar carbonaceous materials, the apparatus comprising an oven, a cylinder rotatably supported at a slight incline in the oven, a vertically-arranged receptacle at the upper end of the cylinder, a curved elbow connecting said members, a fixed discharge-chamber arranged at the lower end of the cylinder and air-tightly connected therewith, whereby the cylinder can be rotated, the cylinder also having an air-tight connection with said elbow permitting rotation of the cylinder with relation to the elbow.

767,110. METHOD OF MAKING MAGNETIC MATERIALS.—Robert A. Hadfield, Sheffield, England. A method of producing a magnetic material of high permeability and low hysteresis action, which consists in alloying a magnetic substance with silicon, reducing the alloy to a thin body, heating such thin body to a temperature below its melting-point, allowing it to cool, reheating it to a temperature above that first employed, and again allowing it to cool.

767,135. HOISTING MECHANISM FOR SUCKER-RODS, ETC.—William M. Brown, Gibsonburg, Ohio. In a device of the class described, a vehicle, a cable-supporting member pivotally secured thereto in such manner as to cause the base of said member when in vertical position to be suspended from said pivotal point, a drum rotatably mounted at the base of said member and movable therewith, cable supported by said member and connected to and adapted to be moved in opposite directions when said drum is rotated.

767,160. METALLIC ALLOY.—Charles A. Meadows, Yonkers, N. Y. A body of alloy for charging melting-pots, to be cast into bearings, printers' types or the like, containing constituents susceptible to separate influences when the alloy is in a molten state, said body or charge consisting of a mass of the alloy converted into small solid pieces or bits thoroughly commingled, the constituent metals of the alloy being distributed throughout the mass or charge in the proper proportions.

767,170. ENGINEER'S SLIDE-RULE.—Leon W. Rosenthal, New York, N. Y. A slide-rule, consisting of a main piece having two fixed bars, one bar having a single logarithmic scale the graduated length of the same, and the other bar having two scales each of half the graduated length of the rule, said scales progressing in one and the same direction, and a movable slide between said bars and provided with a single logarithmic scale on the side adjacent to the single scale of one of the fixed bars and with two scales on the opposite side progressing in opposite direction to each other.

767,179. FURNACE FOR MELTING METALS OR OTHER PURPOSES.—Carl Spiegel, St. Petersburg, Russia. In a melting-furnace, the combination of a fire-plate provided with a naphtha-supply means and with hemispheric projections, said plate being provided with perforations extending through said projections, and upwardly flaring at their upper ends and said projections being on the upper face of the plate, with an air-supply chamber, secured to and under said plate and in communication with said perforations.

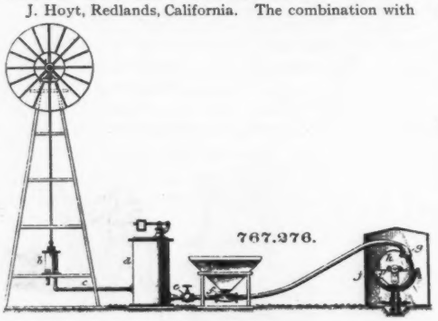
767,216. APPARATUS FOR VACUOUSLY DEPOSITING METALS.—Thomas A. Edison, Llewellyn Park, N. J., assignor to New Jersey Patent Company, Orange, N. J. The combination with an exhausted chamber with metallic electrodes therein and means for effecting an electrical discharge between said electrodes, of supports within the chamber and between the electrodes for sustaining a plurality of objects to be coated, and means for simultaneously rotating said objects.

767,217. GAS-GENERATOR.—John H. Eustace, Chicago, Ill., assignor to John Williamson, Chicago, Ill. In a gas-generator, the combination of a furnace for heating fuel and superheating steam, a carbureter in communication with the furnace and located on top of and in a vertical plane at one side of the central line of the furnace, and a superheater located in juxtarelation to and by the side of the carbureter and on top of and in a vertical plane at one side of the central line of the furnace, the carbureter and superheater having open communication at one end and closed against communication with each other at the other end, and each having therein openings forming a plurality of passages from the top to the bottom of each, and the carbureter at its end closed against the superheater having a chamber into which the superheated steam from the furnace passes and into which a supply of carbonaceous oil is injected for the steam and oil to combine in their passage through the carbureter and form hydrocarbon gas, and the superheater at the end in communication with the carbureter receiving thereinto the hydrocarbon gas for making a fixed gas in its passage through the superheater.

767,219. GAS-COMPRESSOR.—Carl Flohr, Berlin, Germany. The combination with a double-acting gas-compressor comprising a cylinder with a channel connecting its two ends, of a rocking disk valve in said channel and adapted for opening and closing this channel, a compressed-gas-storage vessel partly filled with a fluid and divided by a partition-wall into two compartments one above the other and provided with a communicating tube reaching from the partition-wall down to a point above the bottom, a tube connecting the lower compartment of said compressed-gas-storage vessel with the delivery of said double-acting gas-compressor, a float in the upper compartment of said compressed-gas-storage vessel, and means for positively connecting said float with said rocking disk valve, so that the latter is more or less opened, when said float is moved.

767,243. CONTINUOUS HEATING-FURNACE.—Josef Reuleaux, Wilkinsburg, Pa., assignor to Alexander Laughlin, Sewickley, Pa. A continuous heating-furnace provided with receiving and discharge openings, bearings for a line of slabs or billets extending from the receiving-opening to the discharge-opening and having inclined portions, a fuel-port opening into such furnace at a point beneath and intersecting said inclined portions, a cinder-pocket in line with the entrance of such port into the furnace, and means opening into the port intermediate the upper end thereof and said cinder-pocket for supplying fuel to said port.

767,276. DRY SAND AMALGAMATOR.—Frederick J. Hoyt, Redlands, California. The combination with




an amalgamated mercury-floated rotary sphere, of a pipe, and nozzle thereto, to discharge on said sphere, an air-reservoir, an air-compressor and an air-engine, connected to operate.

767,285. FURNACE-VALVE.—Julian Kennedy, Pittsburg, Pa. A valve for furnace-flues comprising a gas-flue, a disk member adapted to move edgewise in the flue into closing position, and a movable clamp aligned with the middle of the valve-seat and adapted to bear upon the disk member to hold it to its seat.

767,289. HYDROGEN-GAS GENERATOR.—William Kirkwood, Chicago, Ill. In a gas-generator, the combination with an upright vessel of substantially uniform diameter throughout and having an internal surface of acid-resisting metal and an apertured transverse partition dividing the same into an upper receptacle constituting a gas-generation chamber and a lower receptacle constituting in its lower part an acid-solution chamber and in its upper part a closed compressed-air chamber, of a tube secured to the apertured part of said partition and depending into said acid-solution chamber, a gas-discharge connection tapping said gas-generation chamber, a liquid-check valve in said connection, a compressed-air-inlet connection tapping said compressed air chamber, and a safety-valve also communicating with said compressed-air chamber.

767,304. METHOD OF DIVIDING METAL.—Charles A. Meadows, Yonkers, N. Y., assignor to United States Alloy Company, New York, N. Y. A method of dividing metal into small particles, consisting in first melting the metal, causing it to flow in separated continuous streams onto an endless moving surface, bodily carrying the streams along in straight lines, subjecting the under face of the moving endless surface to the action of jets of water to cool the metal while in transit, and finally cutting or subdividing the metal.

767,312. MECHANISM FOR OPERATING DUMP-CAR DOORS.—Spencer Otis, Chicago, Ill., assignor to National Coal Dump Car Company, Rapid City, S. D. The combination of winding-shaft mechanism provided with worm-wheel mechanism thereon, worm mechanism mounted in engagement with such worm-wheel mechanism, and means for moving such worm mechanism into and out of engagement with the worm-wheel mechanism of the winding-shaft mechanism.

767,314. ROLLING-MILL.—Johann Sandner, Dusseldorf, Germany, assignor to Anton Ricards, Dusseldorf, Germany. In a rolling-mill, a series of pairs of parallel overlapping rings arranged to form a progressively-reduced opening, in combination with oppositely-placed driving-wheels engaging said rings

767,333. RECUPERATIVE GAS-RETORT SETTING. —Edward H. Earnshaw and William H. Gartley, Philadelphia, Pa. assignors to The United Gas Improvement Company, Philadelplia, Pa. A recuperative gas-retort setting provided with retorts, a gas-furnace having gas-outlets arranged beneath the retorts, eduction-flues for carrying off the products of combustion, separate systems of induction-flues surrounding the eduction flues and heated thereby and arranged to separately discharge in proximity with said gas-outlets, and means at the points of admission for controlling the intake of air to each system of induction-flues, thereby providing independent secondary air-supplies for different portions of the setting throughout its length.

767,335. DENITRATING PLANT.—Robert Evers, Förde, Germany. In combination in a plant for making sulphuric and nitric acids from an acid mixture, a denitrating-tower, means for supplying steam and hot air to said tower, a condensing-tower, cooling means connecting the said towers, perforated partitions in the said towers dividing them into chambers, and mixing means situated in the said chambers.

767,339. PROCESS OF BRAZING.—Henry F. Hiller, South Dartmouth, Mass. A process of brazing cast-iron, consisting in applying to the metal to be brazed a mixture of boracic acid, carbonate of lime, carminic acid and water, then heating the metal, then applying thereto boric-acid crystals.

767,340. BRAZING COMPOUND.—Henry F. Hiller, South Dartmouth, Mass. A brazing compound consisting of three parts, one part of boracic acid, carminic acid, carbonate of lime, and water, one part of boric-acid crystals, and one part of brass and copper thoroughly united by heat, forming a spelter.

767,365. AMALGAMATOR.—William E. Vandenburgh, Chicago, Ill. An amalgamator comprising a fixed conduit for the pulp, a mercury-trough in the conduit, spherical bodies revoluble in the mercury in the trough, and rings spaced from and extending around the spheres, also revoluble in the trough and disposed with relation to the spheres and in planes substantially parallel with the current of the pulp.

## GREAT BRITAIN

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy.

*Week ending July 23, 1904.*

13,993 of 1903. COAL MINE DRILL.—T. Quoviez, Arras, France. Improved frame for supporting rotary drills used in coal and other mines.

14,013 of 1903. ZINC ORE BRIQUETTES.—C. Cory, Swansea. The use of sago-palm pith for binding briquettes of zinc ores.

14,366 of 1903. ALUMINA FROM SLAG.—L. Wirz, London. Obtaining alumina from blast furnace slags by digesting with galvanizer's waste acids and calcining at high temperatures.

14,386 of 1903. MINE-CAR COUPLING.—D. S. Holloway, Pontypridd. Improved shackle pin for coupling colliery trams, having a pivoted top which works in a slotted hole, so preventing the pin from jerking out.

18,775 of 1903. MINE-CAR COUPLING.—N. Phillips, Tredegar. Safety shackle-pin for mine-cars which has to be moved to an exact position and then turned before it can be released.

19,366 of 1903. ELECTRIC SMELTING OF NICKEL ORE.—Siemens & Halske, Berlin, Germany. In the electric smelting of zinc oxide, preventing the nickel taking up carbon from the electrodes by having a thin layer of slag between the electrode and the charge.

## SPECIAL CORRESPONDENCE.

**San Francisco.** Aug. 14.

*(From Our Special Correspondent.)*

The board of engineers appointed by the Board of Public Works of California, as the result of the 'River Convention' held last May in this city, has begun work. The board consists of Major T. G. Dabney, of Clarksville, Miss.; Major H. B. Richardson, of New Orleans, La., and H. M. Chittenden, Engineer Corps, U. S. A. They were purposely selected from outside the State. With them is associated M. A. Nurse, of Sacramento, member of the State Board of Public Works. The present deliberations are held to determine the best means to reclaim the lands along the Sacramento and San Joaquin rivers and their tributaries.

The reports of the United States Geological Survey, State Engineer, etc., as to flow and discharge of rivers, reservoir sites, etc., are to be considered, and also those of the California Debris Commission as to deposits of debris, restraining dams, etc. The mining community is interested in the conclusions, as well as the farmers who own land along the rivers. The meetings thus far held have been preliminary, and it has been decided to make an extended visit to the streams for examination of details and character of the problems of river improvement. During this trip of inspection meetings will be held at various points to give those conversant with local conditions an opportunity to express their views. The board will first visit the Sacramento, Yuba and Feather rivers, where most damage has been done by mining debris and then take up the San Joaquin river and its tributaries.

The Inyo Development Co., having a plant on Owens Lake, near Keeler, Inyo county, where it obtains soda from the lake waters of the lake and manufactures soda ash, etc., finds that the lake is rapidly drying up. Within the past 10 years the water level has fallen about 15 ft. and the shore line has receded some 5,000 ft. This recession began about 10 years ago, for 10 years previously the pumps were on the water's edge. Within the past three years the water has fallen 2½ ft. annually. At present the pumping plant is 2,000 ft. out in the lake on a pile foundation, where the water is still about 5 ft. deep. The maximum present depth of the lake is about 36 ft., and if the fall continues the lake will be dry before many years.

The supply of water, including the Owens river, has been lessened considerably by the irrigation systems. Some years ago, when an examination was made of this lake, it was estimated that the waters contained 22,000,000 tons of sodium bicarbonate, 8,000,000 tons of potassium, 40,000,000 tons of common salt and 1,000,000 tons of borax.

The suit of the Rawhide Mining Co., of Tuolumne county, against the Tuolumne County Water Co., for $150,000, is on trial in the United States Circuit Court in this city. It is alleged that in 1898 W. A. Nevills, present owner of the Rawhide, and his associates at the time, entered into an agreement with the Jamestown Electric Light & Power Co. to sell a pole line from near Summerville to the Rawhide and App mines, with branch lines to Sonora, and that the Jamestown company should transfer the property to the Tuolumne Water Co. by a conditional bill of sale providing that the title should not vest in the latter company until $150,000 should be paid. It is alleged that the water company was to pay Nevills and associates $150,000 with interest at 6% and charge Nevills et al. $5 per month for every horse-power delivered at the Rawhide and App mines. The water company was to pay Nevills and his partners 40% of the net proceeds of the sale of power and light to others until the whole sum of $150,000 should be paid. It is now alleged that the company has sold $50,000 worth of power each year to private parties at an annual expense of $6,000, but has failed to pay the 40% of the receipts.

Reduction works to handle the bismuth ores of San Bernardino county are in process of erection at Garvanza just outside the Los Angeles city limits at the end of the Santa Fe bridge on the Arroyo Seco. Great things were expected from these works, which were to demonstrate that California could compete successfully with Saxony in the production of bismuth, but now come about 125 residents of Garvanza and Highland Park and ask the supervisors to prohibit the company from operating the reduction works, alleging that the fumes would destroy vegetation. The matter is still in abeyance.

The Mountain Copper Co. is about to start work on the smelting plant at Bull's Head Point, Contra Costa county, near Martinez, where the ores from the mine in Shasta county will be treated. The company was practically driven out of Shasta county by people who complained of smelter fumes. At the new location fuel will be had easily and by making sulphuric acid, there will be no complaint about fumes. The miners of other counties will reap the benefit of purchases of quartz for flux, in the past confined to Shasta county alone.

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**Denver.** Aug. 13.

*(From Our Special Correspondent.)*

In consequence of several cases of lawbreaking in the Cripple Creek district, evidently by an organized gang of whitecappers, which have occurred during the past few days, Sheriff Bell has issued a proclamation directing all citizens to refrain from carrying arms and from congregating on the streets and in public places or using language that may tend to cause violation of the law. The mayors of Cripple Creek and Victor, and the district attorney's office, have pledged themselves to support the Sheriff's office, and all police officers have been instructed to carry out the spirit of the proclamation.

W. J. Donnelly, former mayor of Victor, who is in the hardware business, was called on by a committee a few days ago and told to leave the district. He communicated with the sheriff's office and a number of deputies were sent to protect him. He stopped at the National Hotel for a few days, but has now returned to his home. Mr. Donnelly is a strong sympathizer with the union element, was bondsman for former Chief of Police O'Connell of Victor, who committed suicide in this city a few days ago. A crowd of about 100 went to the Dillon mine on Butte mountain, where it seems a number of men without cards from the Mine Owners' Association were employed, and gave them two days to get cards. A suspicious accident, which resulted in the death of James Borden, led to this action, and very bitter feeling against J. H. Featherstone, the principal lessee of the mine. A number of the men, who could not get the cards, left the district, and Featherstone, to escape from a number of masked men, took refuge in the county jail. He is now under the protection of officers. John Harper, former president of the Victor miners' union, was taken from his house by a number of masked men and driven out of the district. He has since returned and is under the protection of officers. A number of masked men went to the residence of George Seitz, who is working a lease on Raven Hill, and has not taken a mine owners' card, in order to deport him and Seitz, drove them off with a number of shots.

Rev. T. S. Leland, pastor of the Methodist church at Victor, and familiarly known as the cowboy preacher, who has been outspoken in his sympathy with the union miners, was notified by a committee to leave the district at once. His home is under a heavy guard and he states that he will remain.

As intimated in my former correspondence, it was to be foreseen that after the departure of the militia, considering the bitter feeling existing, further trouble would occur. Sheriff Bell intends to do the best he can, but no one will be astonished if troops are sent into the district again to maintain the law and to put down disorder. Terrorism must be stopped and by legal means.

An interesting fight by Geo. A. Suffa, one of the stockholders of the Big Five Mining Co., against the management of the affairs of that company, is in progress in this city.

As the time of the meeting of the American Mining Congress, to be held in Portland on Aug. 22 to 27, approaches, considerable interest is being shown in the fact that a permanent location for the congress will be chosen. This will be, from present appearances, either Denver or Salt Lake City.

Within the past few days articles of incorporation were filed at Durango of the Arizona & Colorado Railroad Co., which intends to build from the point where the Animas river crosses from this State into New Mexico, to Silverton and Dolores, two points on the Denver-Rio Grande system.

At the annual meeting of the auxiliary companies of the Colorado Fuel & Iron Co., in Denver, Aug. 17, the reorganization proposition will be considered. The final action, and action on the proposed extension of the company's business, cannot be taken until the stockholders' annual meeting in October.

About 100 men are at present employed by the leasers on the Stratton's Independence, and this number will probably be doubled in a month or so. Shipments have been resumed and about 100 tons of ore per day are being sent out. The company itself has reserved the fourth level.

The Black Hawk, Gilpin county depot, of the Colorado & Southern Railroad, during July shipped 210 cars of ore to the Denver smelters. Idaho Springs sent out 202 cars, or nearly double the number in July, 1903.

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**Spokane** Aug. 10.

*(From Our Special Correspondent.)*

On account of the inability of some of the smelters to handle the entire output of several mines of the Cœur d'Alenes, the ore shipments for July were several thousand tons less than for June. Output from the Snowstorm at Mullan has decreased, ostensibly because the Butte smelters could not take ore offered. Regular shipments of 50 tons per day were kept up to Tacoma.

The production of the Cœur d'Alene mines for the first half of 1904 was 114,195 tons. The four mines of the Federal Company lead with 48,000 tons; the Bunker Hill & Sullivan had 27,485 tons; the Morning, 16,914; the Hecla, 6,812; the Snowstorm, 7,500; the Hercules, 6,197; the California Consolidated, 562; the Frisco, 350; the Stewart, 160; the Hunter, 150; the Wyoming, 35. The increase of production over the first six months of 1903 was 15,164 tons.

Olaus Jeldness, who has returned from a trip to Siskiyou county, Cal., reports that the Blue Ledge, recently bonded to Dr. J. F. Reddy, of Spokane, and associates, shows a fine copper ore in a tunnel at a depth of 300 ft.

The New York Mining & Smelting Co., controlled by Spokane people, is working a mine in the Eureka district, on Snake river, and are erecting a smelter. Traffic on Snake river should be greatly facilitated by the new steamer, Mountain Gem, which will be in commission in a few days from Lewiston, Ida.

A number of prospectors are going into Priest river, in Kootenai county, northern Idaho, on the strength of the reported strike of free gold in the Farmer Jones property.

The owners of the Crown Point molybdenite mine near Chelan, Wash., are installing machinery. There are two well-defined quartz veins, one 3 ft. and the other 18 in. wide. Small particles of free gold have been found in the quartz. The equipment now going in includes a Schule dry concentrator, made in Hamburg, Germany, and two crushers, and a 22 h.p. Pelton wheel.

Spokane men who are interested in the coal fields of Southeast Kootenay, B. C., have received the conditional licenses issued by the British Columbia government, and are arranging to form companies. The licenses are merely permits and do not guarantee titles, nor do they bind the government to recognize rights as between contestants.

The Rambler-Cariboo Mining Co., largely controlled by Spokane men, has elected A. F. McClane president, John Daly, secretary and treasurer, and W. E. Zwisky manager. The mine is a silver-lead property in the Slocan district. A tunnel is being driven 4,300 ft. to reach the 1,400 ft. level.

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**Salt Lake City** Aug. 12.

*(From Our Special Correspondent.)*

In the damage suit of the Eureka-Hill Mining Co., plaintiff, against the Bullion-Beck & Champion Mining Co., tried before Referee Parley L. Williams, a verdict was given for the plaintiff for $56,942, thrice the value of

158 tons of ore alleged to have been extracted illegally from Eureka-Hill territory. A number of years ago the two companies entered into a compromise agreement, in which vertical boundary lines were established. The Eureka-Hill Co. claimed that the Bullion-Beck Co. had disregarded this agreement, and introduced the evidence of several men who had worked in the Bullion-Beck mine at the time the tresspass was alleged, after the making of the agreement. The defense placed former Superintendent Kirby, and former Shift Boss Roundy on the stand. The referee said that there was direct conflict in the testimony of witnesses, and while he thought Kirby had no knowledge that the work was done, or had forgotten it, the circumstances that a bulkhead was taken out to enable the miners to proceed with the work seemed to justify the conclusion that the work was done with the knowledge of those in charge, and if they did not actually know it, it was their duty to know it. The engineers agreed that the contents excavated in the stope east of the bulkheads was 1,932 cu. ft. The referee concluded that the waste in the stope was relatively small, and deducted 193 ft., or 10%, leaving the cubic contents extracted, 1,738 ft., 153 tons of a total value of $18,980.54, which multiplied by three gives the amount of the judgment for treble damages of $56,941.62. The referee thought $4 per ton a reasonable allowance for mining, and that sum was allowed.

At a meeting of the Columbus Consolidated stockholders, on Aug. 12, the capital stock was increased from 50c. to $5 a share. Subsequently the directors met and levied an assessment of 20c. a share, calling for $60,000. This amount will pay off the present indebtedness and leave a small surplus. The new mill is under cover and will be ready about Sept. 15.

The properties at Tintic owned by the Manhattan and Old Colony & Eureka Mining companies, which adjoin that of the Lower Mammoth Mining Co., are to be consolidated. The stockholders of the former will vote on the proposition on Aug. 16 and the latter on Aug. 17.

The Old Colony is capitalized for 500,000 shares and the Manhattan for 1,000,000 shares. It is proposed to form a new company, with a capital of 500,000 shares. Old Colony shareholders receive 200,000 shares Manhattan, 100,000, and the remaining 200,000 to go into the treasury to be sold for development purposes.

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**Butte.** Aug. 9.

*(From Our Special Correspondent.)*

New suits, amounting in the aggregate to $26,000,000, have been instituted in the Circuit Court of this, Silver Bow, county against F. Aug. Heinze, the United Copper Co., the Montana Ore Purchasing Co., and the Johnstown Mining Co. The plaintiffs are the Butte & Boston Copper Co., the Boston & Montana and the Parrott Copper Co. The plaintiffs allege that the defendants extracted ores and minerals from mining claims owned by the plaintiffs, part of the Amalgamated Copper Co. aggregation. The particular claims involved are the Michael Davitt, the Piccolo, Johnstown, Little Mina and the Nipper claims. As a departure from usual methods in connection with mining litigation here, these actions have not been accompanied with any application for court injunctions against the defendants, and, as noted above, have been filed in this county, in a tribunal before which the Amalgamated Company has claimed that it was impossible for it to get an impartial hearing. The whole affair has an air of mystery to an outside observer of the copper war, which has been going on here so long.

The Amalgamated Copper Co. has purchased all the copper interests held by Mayor Pat. Mullins, of Butte. This purchase includes the satisfaction of the suit of Mayor Mullins against the Boston & Montana Co., wherein Mullins sought to recover a three-quarters interest to the Comanche mining claim by virtue of a certain lease and bond held by him to the property nine or more years ago, and which he was induced to surrender through alleged fraud by the then agents of the Boston & Montana Co.

The Interstate Mercantile Co., with a capital of $2,500, has received a charter. The purpose of this company is to assist the families of deported miners who were driven from the Cripple Creek region, and is a creation of the Western Federation of Miners. The real object of the incorporation, as stated by the attorney employed in preparing the articles of incorporation, is for the purpose of being able to apply direct to the Federal court, if the affairs of the company should meet with interference by the State authorities in its business transactions in the State of Colorado. It is the intention to open stores at several points in Teller county, conducting business as a foreign corporation.

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**Toronto.** Aug. 11.

*(From Our Special Correspondent.)*

The coroner's jury in the case of the six miners killed at the Shakespere gold mine, Webbwood, Ont., returned a verdict of accidental death by suffocation, owing to the neglect of the company to provide ventilation. W. E. H. Carter, Provincial Inspector of Mines, who attended, states that the ventilating apparatus was in good order, but the disaster was due to its not being used, the engineer having neglected to blow air into the shaft. Manager McMillan, after the men had been suffocated, turned on the air pressure, and, after waiting a quarter of an hour, descended in the hope of effecting a rescue, but met death like the others. Mr. Carter states that the evidence went to show that curiosity to see the value of the stringer uncovered by the blast impelled the miners to unusual haste in their descent and made them heedless of the danger.

The Provincial Bureau of Mines has received a report from J. G. McMillan, in charge of the exploration party sent to the Lake Abitibi region. In the country so far explored the rocks are Huronian, with few outcroppings. In Tully township was found greenstone impregnated with pyrites, and in McCart township a bluish quartzose schist bearing magnetite and pyrites occurs.

Encouraging results have attended development work at the Sultana gold mine in the Rat Portage district. At the eighth level quartz has been found as rich as the former productive lodes, showing visible gold. It was cut in the winze, but the dip indicates that it will extend to the shaft at a lower level.

A new pool is being developed in the Petrolia oil region, 5 miles west of Petrolia, where for some months the Canadian Oil Fields, Ltd., J. D. Noble & Son, and Bradley, Rawson & Faulkner have been successfully operating. The general run of the wells sunk is from 10 to 15 bbls. per day, though one of the Canadian Oil Fields wells has been yielding from 30 to 40 bbl. This company has completed a large pumping plant with an engine run by natural gas. A few days since the Petrolia Torpedo Co., operating a couple of miles south of what had been supposed to be the limit of the pool, struck a well yielding 100 bbl. a day and simultaneously J. D. Noble & Son made a 40-bbl. a day strike about half a mile farther to the north. The section where these strikes are occurring was entirely overlooked in the early days of the oil boom, though in later years some drillings were made without success. These discoveries have given a great impetus to the oil industry. Drilling is going forward actively.

Thomas W. Gibson, director of the Ontario Bureau of Mines, left Toronto on August 9 to visit some of the mines in northern Ontario, including the Sudbury nickel range, in company with Dr. Coleman, now engaged in exploration in that part of the country. He will also inspect a portion of Algonquin Park, returning in about two weeks.

The British Columbia Process Co., Ltd., capital $500,000, head office Toronto, has been incorporated, with Allan B. Cook, Geo. F Kingsley, R. M. Melville and Chas. P. Green, all of Toronto, and Claud B. Taylor, of New Liskeard, provisional directors.

The Canadian Ore Concentration, Ltd., incorporated under the laws of Britain, has been granted a license to do business in Ontario.

By a decision of the Imperial Privy Council on August 5, the Calgary & Edmonton Railway Co. has received the right to the minerals on the lands in the Northwest granted it by the Government as a subsidy for the construction of portions of its road to the extent of 6,400 acres per mile. The Government refused to issue the patents without reserving the minerals, whereupon the company brought suit in the Canadian courts, contending that the minerals were included in the grant. The Supreme Court of Canada decided against it, but the judgment just given overrules that decision.

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**Victoria.** Aug. 9.

*(From Our Special Correspondent.)*

A Victoria newspaper recently published an estimate of the mineral production of the Province for the half-year ending June 30. According to this estimate, which appears to be reasonably accurate, the output of lode mines was 697,213 tons, computed to have yielded: gold, 123,329 oz.; silver, 2,037,061 oz.; copper, 17,513,886 lb.; lead, 16,500,000 lb. The 1903 returns were: 1,286,176 tons; gold, 232,831 oz.; silver, 2,996,204 oz.; copper, 34,359,921 lb.; lead, 18,089,283 lb. Whether or not the estimate given for this year is absolutely correct, it is nevertheless certain that there has been a material increase in mineral yield, principally in silver-lead production due to improved conditions.

*Yukon.*—To June 20, the output of gold from the Yukon had reached a value of $3,866,317, or an increase of nearly $150,000 over last year's returns for the corresponding period.

*Kamloops.*—The installation of the new plant at the Iron Mask mine is completed and work will start at the cencentrator next week. Underground work has been resumed, and it is expected the mine will give employment to 100 men. The new owners of the Copper King have begun work.

*Similkameen.*—At the annual meeting of the British Columbia Collieries Co. the president reported that the properties had been surveyed and that the result of recent prospecting had been satisfactory. An agent of the Canadian Pacific railway has been in the Nicola district for some time examining coal areas and has secured bonds on 19,600 acres of land. The company has a diamond drill at work which, at one point, penetrated two coal veins, one 4 and the other 6 ft. thick, within 100 ft. of surface.

*Lardeau.*—On the Wall Street group at Camborne, a 35-ft. vein of quartz is reported struck by tunneling.

*Slocan.*—At the annual general meeting of the Rambler-Cariboo Co. in Kaslo, the following officers were appointed: A. F. McClaine, president; J. D. Chaplin, vice-president; John Daly, secretary-treasurer, and W. E. Zwicky manager. At the mine a large amount of development work is in progress, including a tunnel which, when completed, will be 4,420 ft. long. Mr. G. Alexander has notified the city of Kaslo of his intention to erect a magnetic separator at that place.

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**Monterey.** Aug. 10.

*(From Our Special Correspondent.)*

The rumors of new smelters to be erected in Mexico, if recorded, would fill a book, yet the most likely one, that for Chihuahua, is by no means a certainty as yet. Mr. Dwight Furness, American consul at Guanajuato, places the one credited to him for Guadalajara among the myths. Mr. Furness is, however, interested in some properties in the State of Jalisco, which may ultimately require a smelter. Among the latest of these properties is the Agua Blanca (two days' hard riding, southwest from Ameca), about 5% copper. Hoists and pumps have been installed to sink a winze from some former workings. The Keystone Copper Co.'s smelter is now in blast in La Palma district, west of Tapalpa, smelting the ore from its La Mexicana mines. A complete 150-ton plant, for the Pohle-Croasdale process of volatilization, is being erected near Etzatlan, on the Santo Domingo mine of the Amparo Mining Co., of Philadelphia. The old Culebra mine, at Etzatlan, which was abandoned in 1843, has been opened up by Messrs. I. C., H. K. and F. H. Myers, who now claim to have in a 165-ft. tunnel about 2 in. of ore running 60 oz. in silver and ¼ oz. gold.

Messrs. J. J. Mann and W. M. Mathews, of Philadelphia, have bought the San Pablo group, near the Santo Domingo, of Etzatlan, and are working some 40 men. The San Felipe Mining Co. is pushing development work on its properties at Hostotopoquila, about 30 miles north of Etzatlan. Near Parsao, 65 miles southwest of Ameca, the San Rafael Mining Co. is paying well on a silver-lead ore with a 5-stamp battery and Wilfley tables. For the Mascota Mining Co., just north of Mascota, a 100-ton matte smelter is to be erected under the management of H. S. Church. The Hacienda Jacobina has been purchased of Sra. Teresa Gonzalez for $40,000, Mexican, by the Central Smelting Co., to use of water power from the San Tomas river for its stamps and concentrating mill. Ralph E. Beach and associates of New York have taken a $700,000 option on the Ferreria de Tula mines and foundry on the Zapotlan branch of the Mexican Central railroad.

In the State of Michoacan, El Oro district, the Maria Luisa y Anexas is planning on a large reduction plant on the Tacambaro river. In the Ximulco district, 14 pertiencias, known as La Jerezana, are reported sold to a French company at $3,000,000, Mexican.

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**London.** Aug. 8.

*(From Our Special Correspondent.)*

The recently formed firm of steel manufacturers, Guest, Keen & Nettlefold, continues to justify the policy of its founders, for the profits for the year ended June 30 amounted to over £400,000. It will be remembered that the firm was formed four years ago for the purpose of amalgamating the Dowlais steel works with certain other companies that were large users of steel. The object was to bring methods of business and metallurgical practice up to date by bringing together into one firm collieries, iron mines, blast furnaces, and users of steel, and to adopt all the advantageous points of British, German and American metallurgical practice. With able metallurgists like Windsor Richards and Edward Martin, and business men like Arthur Keen and the Nettlefolds, the amalgamated company started out with every promise of success. The expectations of the organizers of the amalgamation have been fully realized, and the company is now in a very secure position.

Another great iron and coal company is now attracting the attention of the public in a manner, unfortunately, very different from Guest, Keen & Nettlefold. I refer to the firm of Pease & Partners, which is one of the largest companies in the North of England, owning collieries, iron mines, works, railways, etc., in the Middlesbrough and Durham districts. The family of Pease is an old one, and until 1898 the properties were all held privately. In that year the company was reconstructed and subscriptions were invited from the public. In this way the family realized part of their holdings. For a year or two all went well, and the shares were reckoned an excellent investment. During the last year or two the profits have not been so satisfactory, but it was not until the issue of the report for the year ended June 30, 1904, that the position of the company was found to be shaky. This report shows that the profits have seriously fallen, and there is a good deal of uneasiness as to the position of the company, and the value of its assets. The Pease family has been very unfortunate during recent years, and their other businesses as well as Pease & Partners have been in a very unsatisfactory state. Their banking house, J. & J. W. Pease, collapsed, and various firms of manufacturing engineers in which they have interests are in difficulties. Their misfortunes arose chiefly from the fact that the late Sir Joseph Pease was getting an old man and gradually losing his business faculties. He was, however, an autocrat and would not submit to be told that his powers were waning. After the failure of his bank he broke down and died. As regards the present value of Pease & Partners shares as investments, the public are not quite sure how far the business is involved in difficulties, due to the failure of judgment on the part of Sir Joseph, so that they are likely to suffer for some time in the estimation of the investor.

**Melbourne.** July 11.

*(From Our Special Correspondent.)*

One or two events of special importance have happened here. The first is the practical throwing up of the sponge by the New Chillagoe Railway & Mining Co. This venture was promoted amid a great flourish of trumpets some three or four years back, owing to the optimistic reports of Messrs. Alex. Stewart, general manager of the Broken Hill Proprietary Co., and George Smith, manager of the Australian Broken Hill Consols. These two mining men took charge of the venture, which comprised a score of big leases, the total area being nearly as big as one of your States. Some sensational estimates were given of the copper and lead resources of the region, but an awakening came slowly through the persistent slump in the share market following condemnatory reports by private mining experts. At last the directors visited the field and called in expert outside advice to assist Mr. Weinberg, who had been vested with the general management. The result was a tremendous cutting of Mr. Stewart's estimates and the reconstruction of the company to do prospecting. Now the directors have to say that developments have continued disappointing except at one or two spots, and therefore they cannot meet the debenture interest. They wanted, however, to carry their 100 miles of railway on to the Etheridge gold field, but wished the government of Queensland to guarantee a part of the £500,000 required for the work. The government declined, and the result has been a partial accentuation of a political crisis in the State, the deciding votes as to the fate of the Morgan ministry having probably been those which want to promote and help private enterprise. The voting, however, is so close that the 'outs' could not rely on a majority. The result may be a dissolution of the local parliament. If that should occur the labor party is pretty sure to come back strengthened and then the fate of the railway extension will be more problematical than ever. It is odd, however, that the company has had much more encouraging news from the field, while its fate has been trembling in the balance. Debts due by the company include £500,000 to English debenture holders for money lent to build the railway from Mareeba to Chillagoe and to put up a big nest of smelters. It is typical of the whole business that the smelters were built long before the mines were proved.

The other item is the decision of the Broken Hill Proprietary Co., and the Mount Lyell Mining & Railway Co., to embark, as rivals, in the manufacture of sulphuric acid and superphosphates. The Delprat acid process for the recovery of zinc concentrates compelled the Broken Hill Proprietary to engage in the manufacture of sulphuric acid. To do this it employed the Carmichael-Bradford process for desulphurization of slimes and concentrates, and found the costs so low, the $SO_2$ produced so concentrated, and the slime, by admixture with gypsum, clinkered into such a valuable smelter product that it decided to erect a big sulphuric acid plant at Port Pirie in South Australia. It will, if it likes, employ South Australian phosphate rock from the deposits, or import from Christmas Island or some of the Polynesian islands. The Mount Lyell company proposes to use up its low-grade heavy pyrites for making acid. These will be shipped from the mine in Tasmania to this State, the company having decided to have its works on the river Yarra near Melbourne. The Mount Lyell pyrites contain about 45% sulphur and the Broken Hill ore about 14%. Sulphuric acid has been made hitherto by a ring of firms who imported crude sulphur from either Japan or Sicily. These have dominated the market, and view the new enterprise with ill-concealed disgust.

The gold fields of this State show a steady improvement owing entirely to the prosperous condition of Bendigo, but it is doubtful if the limit has not been reached, until the big alluvial schemes of Messrs. Bewick, Moreing & Company fructuate. The Bendigo output for 6 months of this year was 117,680 oz. Calls made in the district aggregated £80,102, and dividends paid £186,198. Calls in the corresponding terms last year were £63,406, and dividends £130,394.

## TO ENGINEERS VISITING NEW YORK.

A room for the exclusive use of visiting mining engineers is maintained at the New York office of the ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL, and making this office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

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## TO ENGINEERS VISITING LONDON.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers nonresident in Great Britain, the privilege of free use of the Institution offices and library in Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution, and thus enjoy the advantages of temporary office accommodation in the city of London.

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## PERSONAL.

Mining and metallurgical engineers are invited to keep the ENGINEERING AND MINING JOURNAL informed of their movements and appointments.

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Mr. J. R. Williams, of Guanajuato, Mexico, is in Chicago.

Mr. Charles M. Schwab has returned from a short trip to Europe.

Mr. P. G. Lidner has returned to New York from Charlotte, North Carolina.

Mr. D. P. Rohlfing is examining mining property in Beaver county, Utah.

Mr. C. A. Weck has gone from Jamestown, California, to Yerington, Nevada.

Mr. Preston H. Haskell, recently in Tennessee, is now at Sulphur Mines, Virginia.

Mr. Thomas Young, manager of the M. A. Hanna coal mines in Ohio, has resigned.

Mr. Uriah Dudley, of Kalgoorlie, West Australia, is visiting the Exposition at St. Louis.

Mr. Douglas Brown is examining mining properties for an English syndicate in Sinaloa, Mexico.

Mr. Edward L. Dufourcq has returned to New York City from a professional trip to Mexico.

Mr. E. Gybbon Spilsbury is inspecting mines of the United Mining & Development Co., in Mexico.

Mr. F. G. Frink has been appointed assistant professor of civil engineering in the University of Illinois.

Mr. Edmund Juessen recently returned from a professional trip through northern California and Idaho.

Mr. T. P. Bisland has gone to Cottage Grove, Oregon, in the interest of some gold properties near there.

Mr. F. W. Page, general manager of several mining properties in Mexico, is at Duluth, Minnesota.

Mr. T. W. Gibson, director of the Ontario Bureau of Mines, is on a tour of inspection in Northern Ontario.

Mr. R. R. Simpson, of the Geological Survey of India, is spending some months in England on leave of absence.

Mr. Floyd Davis has been appointed consulting engineer of the Ures Consolidated Mining Co., in Mexico.

Mr. W. A. Paine, president of the Copper Range Consolidated Co., is visiting the mines of the company in Michigan.

Mr. J. F. Kelley is superintendent of the West Gold Hill Mining & Milling Co.'s property at Gunnison, Colorado.

Mr. Frank H. Probert, of Los Angeles, Cal., will visit the Randsburg district in California, to examine some gold properties.

Mr. C. L. Dignowity has been elected a delegate from Utah to the Mining Congress in place of Mr. C. C. Goodwin, who is unable to attend.

Mr. Charles Repath is now mechanical engineer with the Anaconda Copper Mining Co. at Butte.

Mr. P. O. Weles is assistant superintendent of the Lake Superior smelter on Dollar Bay, near Houghton, Mich.

Mr. Charles V. Drysdale, of the electrical engineering department of the Northampton Institute, Clerkenwell, London, is now in this country.

Mr. Anthony J. McMillan, managing director of the Le Roi Mining Co., passed through New York City on his way from London to British Columbia.

Mr. G. B. Wilson, who has been for some time at Tong Shan, North China, has returned to this country, and is now at Bakersfield, California.

Mr. E. P. Gilman, of the firm of Pellew-Harvey, Bryant & Gilman, of Vancouver, B. C., is examining a mining property on Princess Royal Island.

Mr. Frank N. Gibbs, of the Delagoa Bay Development Corporation, recently arrived in London, on business connected with that company's affairs.

Mr. Barry Searle has returned from Nicaragua, where he has been directing operations for the Nicaragua Gold Mining Co., of New York, for eight months.

Mr. H. N. Bowen, for the past year superintendent of the Annie Laurie mine at Kimberly, Utah, has resigned that position, and has removed to Salt Lake City, Utah.

Mr. Halbert S. Kerr, formerly general superintendent of the Denver & Rio Grande Railroad, has been appointed general manager of the Cerro de Pasco Railway, Peru.

Mr. Henry Whittlesey, who has been for three years in charge of the cyanide plant of the Oriental Consolidated Mining Co. in Wonsan province, Korea, is now in Spokane.

Mr. John T. Been, formerly connected with copper properties in Mexico, has been appointed chief mining engineer of the Tamarack Mining Co., Michigan, to succeed Mr. John B. Watson.

Mr. A. Van der Naillen, of San Francisco, has been appointed by the Belgium world's fair directors a commissioner to represent California at Liege, Belgium, from April to November, 1905.

Mr. Frank S. Jones, manager for the Miller Creek Coal Co., Coalfield, Iowa, has resigned to become manager for the Huntington Fuel Co., of Huntington, Ind. He will make the change September 1.

Mr. T. A. Rickard, Editor of the Engineering and Mining Journal, who has been spending some time in the Lake Superior copper country, leaves Houghton this week, on his way to Portland, Oregon.

Mr. Charles Colcock Jones, lately mining and examining engineer of the Mountain Copper Co., Ltd., of Shasta county, Cal., has opened an office for consulting work in mining and metallurgical engineering, at Salt Lake City, Utah.

Mr. Roscoe Cornell has been appointed manager of the branch office which the Allis-Chalmers Co. has just opened in El Paso, Texas. Mr. Cornell goes to the Allis-Chalmers Co. from the Mine & Smelter Supply Co. of Denver. He is a graduate of the Michigan College of Mines, and is a mining and mechanical engineer.

Mr. James W. Lyons has resigned as manager of the power department of the Allis-Chalmers Co. to accept the appointment as consulting engineer to the Elgin Watch Co., of Elgin, Ill., that will erect extensive new works under his supervision. Mr. Lyons will also engage in other consulting work, and his headquarters will be at Chicago.

Mr. George D. James, civil and mining engineer, of Denver, representing Eastern capital, has several surveying parties in the field, gathering accurate data in Colorado, Utah, New Mexico, Arizona and California, on the feasibility of generating electric power on the Colorado, Green, Grand, Arkansas, Rio Grande, South Platte, Pecos and Gila rivers and their tributaries, to supply mining camps with power and to supply other sections, with water for irrigation and domestic purposes.

## OBITUARY.

George A. Chalfant, former president of the Spang-Chalfant Co., iron and tube works of Etna, Pa., died at Detroit August 11, aged 63 years, from the effects of injuries received in falling from the third-story window of his hotel while walking in his sleep. In 1890 Mr. Chalfant became president and general manager of the Spang-Chalfant Co., and held the position until two years ago, when he sold his interest and retired from business. Mr. Chalfant was the first to use natural gas in Alleghany county for manufacturing purposes.

George Clinton Gardner died at Richmond Hill, L. I., August 12. He was born in the city of Washington in 1834. He assisted in establishing the boundary between the United States and Mexico from the Pacific Coast to the Gulf of Mexico. In 1856 the Government commissioned him astronomer and surveyor of the Northwest boundary. His first railroad service was with the Philadelphia & Erie Railroad in 1869. He was the first American engineer to use nitro-glycerine in blasting, while building the great docks at Erie. He organized the railroad shops of the Pennsylvania system at Altoona, Pa. At the time of his death, besides the official positions he held in several railroads, he was receiver of the Flemington Coal & Coke Co. and vice-president of the Pittsvein Coal Co. He leaves a widow and five children.

## SOCIETIES AND TECHNICAL SCHOOLS.

*Society for the Promotion of Engineering Education.*—The next meeting of this society will be held at St. Louis, September 1, 2 and 3, in the Education Building of the Louisiana Purchase Exposition. Besides President Allen's address, papers are promised from Messrs. John F. Wallace, Alfred E. Burton, Ira N. Hollis, Henry S. Munroe, Edward R. Maurer, Leander M. Hoskins, Anson Marston, Alfred Kenyon, Benjamin F. Groat, Emery H. Powell, John M. Mack and Alexander C. Humphreys.

## TRADE CATALOGUES.

"Nutriotone," a tonic for horses, and especially adapted for animals used in mines, is the subject of a circular issued by the W. D. Carpenter Co., of Chicago.

William R. Perrin & Co., of Chicago, have prepared a circular descriptive of the filter presses made by them, with especial reference to slimes. It contains much valuable information.

The Baldwin Locomotive Co., of Philadelphia, in its record of recent construction No. 4, describes its locomotives exhibited at the St. Louis Exposition. It contains also illustrations and descriptions of some of the most notable engines turned out from the company's shops since 1832. It is a striking exhibit of the growth and resources of this company.

The Connersville Blower Co., of Connersville, Ind., has issued recently three attractive catalogues. No. 4 illustrates and describes its standard positive-pressure blowers; No. 6 is devoted exclusively to foundry blowers, and No. 7 deals with the different styles of gas exhausters and high-pressure gas pumps. All these catalogues contain excellent pictures of the engines described.

The A. Leschen & Sons Rope Co., of St. Louis, has prepared an exceedingly interesting and attractive description of the great aerial wire rope tramway built by it for the North American Copper Co., at Encampment, Wyo. The magnitude of the undertaking is graphically shown by pictures of different sections of the tramway. The total length is 16 miles, and the highest tower is 69 feet.

The B. F. Sturtevant Co., of Boston, which has recently moved to its new office and works at Hyde Park, Mass., has recently issued a catalogue containing details of the Sturtevant standard and pony types of economizers in comparison with those of other makes, the advantages, sizes, weights, accessibility, repairing, etc. It also treats of the subject of mechanical draft and natural draft, and is of interest to all steam users.

## INDUSTRIAL.

The Alliance Machine Co., of Alliance, O., has received a large contract for mining machinery for Peru.

The Colorado Fuel & Iron Co., of Pueblo, Col., has received an order for 4,000 tons of 85-lb. steel rails for the White River branch of the Missouri Pacific Railway.

The Brown-Corliss Engine Co., of Corliss, Wis., has filled a contract for a 3,000 h. p. cross compound rolling mill engine to the Lorain Steel Co., of Lorain, Ohio.

The Pacific Steam Economizer Co., of Los Angeles, Cal., invites correspondence from those who are interested in the purification of water for boilers and other purposes.

The Power & Mining Machinery Co., of New York City, has established an office at 19 Commerce street, Monterey, Mexico, to handle its growing trade in the Republic. E. Rochette is in charge.

The Stromberg-Carlson Telephone Manufacturing Co., of Chicago, Ill., has recently sold mine apparatus and other supplies to the Cambria Fuel Co., of Cambria, Wyo, the successor of the Cambria Mining Co.

The Birmingham Boiler Works, W. M. Crellin, of Birmingham, Ala., proprietor, has been relieved from its receivership, and Mr. Crellin is in full control and is making preparations for a steady operation of the plant.

The Union Iron Works, of Spokane, Wash., has been making a Blanchard blast furnace for the Turk mine in Cedar Canyon, Wash. The rated capacity is 100 tons. It will handle gold, silver and copper ores, and is to cost $40,000.

The United Coke & Gas Construction Co., of Sharon, Pa., a subsidiary company of the United States Steel Corporation, has received an order for 80,000 tons of coke for the blast furnaces of M. A. Hanna & Co., of Cleveland.

The International Steam Pump Co., has secured a contract from Pedro Alvarado, for the complete electric pumping equipment of his Parral, Mex., mines. It calls for both station and sinking pumps of special high lift turbine type.

The Federal Refractories Co. has the office finished and the factory buildings nearly completed, at its plant at Alexandria, Huntington Co., Pa. Work on the kilns has been started and it is expected that brick will be made this year.

The Chicago Pneumatic Tool Co. has received an order for air compressors, etc., and the necessary tools for operating its entire plant by means of compressed air from the British iron and steel firm of Dorman, Long & Co., of Middlesboro.

The Colorado Iron Works, of Denver, Colo., is constructing the machinery for the Ruby Basin plant, near Silverton, Colo. A few days ago it shipped a 300-ton lead furnace to Missouri, and has manufactured 24 impact screens during the past month.

S. W. Traylor has organized the Traylor Engineering Co. for the manufacture and sale of the patented Traylor centri-pact screen. The company is now equipping a plant in Newark, N. J., for its manufacture, and will have offices at 118 Liberty street, New York City.

The Rawton, Morrison Co., of Cambridge, Mass., has purchased the business of the John A. Mead Manufacturing Co., of Rutland, Vt., manufacturers of coal carrying machinery. The companies have been consolidated as the Mead-Morrison Manufacturing Co., with offices at Cambridge.

The Semet-Solvay Co., of Detroit, Mich., has ordered from Messrs. William Johnson & Sons (Leeds), Ltd., of Leeds, England, a briquetting plant having a capacity of 50 tons in 10 hours, for making domestic briquettes, composed of 60% coke breeze, 30% bituminous coal and 10% pitch.

The Nevada Engineering Works, of Reno, Nevada, has increased the capacity of its foundry by the erection of a new building 40 by 150 ft., with side wings. The company is turning out every kind of iron and steel work, and is manufacturing mining machinery, mine cars and locomotives.

The Cannon Pump Manufacturing Co. is now setting up its machinery at North Birmingham, having moved to the Birmingham

district from Waycross, Ga. The plant will turn out about 40 complete pumps a day. Malleable castings will be purchased in Springfield, Ohio, with the ordinary castings purchased in Birmingham. A gasoline engine company for the manufacture of gasoline engines in the Birmingham district will also be organized.

The Allis-Chalmers Co. reports the following recent sales of machinery: To the Middle March Copper Co., a new Erie steam engine with 10 in. by 12 in. cylinders and two 5-ft. Huntington mills. To the Mass Consolidated Mining Co., of Michigan, an Overstrom table; to the Calumet & Hecla Co., Michigan, an Allis-Chalmers 2-stamp gravity battery, and to the Galena Iron Works Co., of Wisconsin, an Overstrom concentrating table.

The B. F. Sturtevant Co. is fitting up quarters in its big plant at Hyde Park, Mass., to be used for an emergency hospital in case of accident to employees. This is to be equipped with all the appliances known to medical and surgical science for the proper care of the men who may be injured until they can be removed to their homes. A graduate nurse and medical student will be in charge, and a local doctor will attend to all surgical cases.

The C. O. Bartlett & Snow Co., of Cleveland, Ohio, reports the following orders recently received: City of Winnipeg, Manitoba, a 4-compartment direct heat rotary dryer, capacity 100 tons of sand per day; Silver Cup Mines, Ltd., Ferguson, B. C., a single cylinder direct heat rotary dryer, using waste heat from ore roasters, capacity 50 tons of slimes per day; James Kirk & Co., a steam dryer; Washington Carbon Co., a complete outfit of conveying and elevating machinery for a new plant at Wellsville, W. Va.; Semi Steel Co., Cleveland, Ohio, elevating and conveying machinery for a large brick plant to be erected at St. Paul, Minn.

The J. Geo. Leyner Engineering Works Co., of Denver, recently shipped a complete machinery plant, including compressor, hoister and drills, to the Violet Mines, Ltd., of Alaska; a large air compressor to the Westport Coal Co., of New Zealand; an air compressor and several drills to Japan; a complete mining plant to the Red Mountain Railroad, Mining & Smelting Co.; compressor and hoister to the Dakota Mining & Milling Co. at Deadwood; compressor and drills to the Nobles Gold Mines, in California; a single-decked mine cage to the Columbus Company at Deadwood, and two double-decked mine cages to the Uncle Sam mine at Roubaix, South Dakota.

## GENERAL MINING NEWS.

*Petroleum Exports.*—The Bureau of Statistics of the Department of Commerce and Labor reports the exports of mineral oils from the United States for the seven months ending July 30. The figures are in gallons:

| | 1903. | 1904. | Changes |
|---|---|---|---|
| Crude | 68,160,659 | 52,544,483 D. | 15,616,176 |
| Naphthas | 5,209,099 | 10,869,254 I. | 5,660,155 |
| Illuminating | 365,941,903 | 428,798,150 I. | 62,856,247 |
| Lubricating | 55,085,033 | 47,270,539 D. | 7,814,494 |
| Residuum | 4,682,244 | 19,836,945 I. | 15,154,701 |
| Totals | 499,078,938 | 559,319,371 I. | 60,240,433 |

Paraffin is included under lubricating oils. The total value of these exports was $37,525,634 for the seven months in 1903, and $44,881,082 for this year.

## ARIZONA.

COCHISE COUNTY.

*Arizona Copper Co.*—The production of copper for July was 1,189 tons of 2,000 lbs. each.

*Calumet & Arizona.*—Four boilers of 250 h. p. each are being installed at this mine at Bisbee. The shaft is now down 910 ft.

GILA COUNTY.

*Old Dominion Copper Mining & Smelting Co.*—The old smelting plant of this company at Globe was partially wrecked Aug. 6 by the explosion of No. 2 furnace. It is supposed to have been caused by a leak in a flange of the furnace.

GRAHAM COUNTY.

*Federal Mining Co.*—The smelter near Safford is now in successful operation. The company contemplates the erection of a larger furnace.

*Standard.*—A 25-h.p. engine has been installed at this mine at Clifton.

SANTA CRUZ COUNTY.

*Hermosa Mining & Milling Co.*—The new mill in this company's mine at Nozales has been completed and operations have begun.

YAVAPAI COUNTY.

*Bradshaw Mountain Copper Mining & Smelting Co.*—This company at Middleton has purchased the Val Verde smelter. It is to be used for custom purposes, and its capacity is now being doubled.

*Empire.*—This mine at Groom Creek is closed down on account of litigation.

*Midnight Tent.*—The shaft in this mine at Groom Creek is down 140 ft.; a crosscut is being run to tap a ledge.

*Monica.*—This mine, four miles northeast of Yarnell, has been leased by T. M. Earnhart and others. A cyanide plant has been put in and the old power stamps replaced by gravity stamps.

## CALIFORNIA.

AMADOR COUNTY.

*Defender Mining Co.*—At this property, Defender, the shaft has been completed down to 350 ft. and a 7-ft. ledge has been encountered in the north drift. The mill will soon be started.

*Fremont Consolidated Mining Co.*—At this company's mine at Drytown, Arthur Goodall, secretary and manager, 20 of the 40 stamps are being operated day and night.

CALAVERAS COUNTY.

*Demarest Gold Mining Co.*—At this mine, Angel's, the unwatering is about completed. The shaft will be enlarged and retimbered.

*Duryea.*—This old mine at Central hill has been reopened by D. A. Nuner, one of the owners, and good gravel has been found.

*Del Monte Mining Co.*—The 10-stamp mill of this mine at Mokelumne hill, Geo. I. Wright manager, has been burned, at a loss of about $55,000. The company is prospecting a small ledge found in the lower tunnel.

*Emma.*—This quartz mine, between Campo Seco and Valley Spring, is to have a 40-stamp mill. The development work has shown up good rock.

EL DORADO COUNTY.

*Darling.*—An electric power plant is being installed at this mine near Georgetown.

*Monte.*—A new double compartment shaft has been started on this mine, Gold Hill district. The new mill is running on ore from the lower tunnel.

*River Hill Mill & Mining Co.*—At this company's property near Placerville, Thomas Clark manager, the main ledge has been cut on the 1,000-ft. level.

*Star.*—At this mine, near Latrobe, new machinery has been installed, and will crush 20 tons daily. G. H. Jones and associates are working the mine.

KERN COUNTY.

*Gem.*—At this mine, near Democrat Springs, machinery for working the ore will be put in.

LOS ANGELES COUNTY.

*Big Horn.*—At this mine, on Little Baldy, near the headwaters of the San Gabriel river, the 10-stamp mill has been put in running order, and a 40-ft. ledge of low grade ore has been cut in the tunnel at a depth of 400 ft. It is owned by the Lowell & California Mining Co., composed mainly of Los Angeles men.

MENDOCINO COUNTY.

*Copper Queen.*—Work is being pushed at this mine, near the head of the Garcia river at Ornbaun. A new ledge of copper ore has been found between Cold creek and Witter springs, and is under bond to Wm. Ornbaun.

NEVADA COUNTY.

*Gaston Ridge Mining Co.*—Ten stamps have been added to the 30 already in the mill at this company's mine at Gaston.

*Golden Star.*—At this mine at Forest springs, under bond to Arbogast Brothers, a new hoist and pump are being installed. The mine has not been worked for some time, but there is now a 2-ft. ledge showing free gold in places.

*Ironclad.*—Work on this mine at Rough and Ready has been stopped temporarily, owing to the breaking down of the pump. Heavier machinery is to be put in, and a mill will be erected.

*Lecompton Mining Co.*—The shaft at this company's mine, Nevada City, W. H. Dunlop superintendent, is to be deepened from 400 to 1,000 ft.

*Red Hill, Ltd.*—This company has deeded back to Mrs. H. L. Trevaskis the patented quartz mining land on Red hill near Grass valley. A company will be organized to work the ground.

*Standard.*—In this mine at Grass Valley, J. F. McAvoy, superintendent, a 6-ft. ledge was recently uncovered. The hoisting and pumping plant will admit of sinking 200 ft. deeper, and it is intended to erect a mill.

SHASTA COUNTY.

*Great Western Gold Mining Co.*—The smelter building at the Afterthought mine of this company has been completed, and it is reported that the machinery is being put in place.

*Huron Gold Mining & Construction Co.*—This company is working a dredge in the Sacramento river opposite Middle creek, three miles from Redding. Submarine divers form part of the dredging crew.

*Marina Marsicano Mining Co.*—The Sunny Hill mine of this company will be reopened and operated on a large scale and a modern milling plant installed.

*Mount Shasta Mines Co.*—This company, on Clear creek west of Shasta, is to be absorbed by, or combined with, the Phoenix Consolidated Copper Co., of Michigan, and the latter company will continue work on the mines. The combination will enable the property to be opened on a larger scale.

SIERRA COUNTY.

*Dolly Varden.*—This mine, in Jim Crow canyon, under bond to W. C. Oaks, is being opened up.

*Poker Flat Mining Co.*—A test run of the mill at this mine, Poker Flat, is to be made and the concentrates shipped and sampled, after which it will be decided whether they will be treated by cyanide or chlorination process.

*Tightner Mining Co.*—This company's mine near Alleghany continues to yield exceptionally rich ore. It is under bond to H. L. Johnson.

SISKIYOU COUNTY.

*Gold Dike Mining & Milling Co.*—This company has been incorporated by L. S. Barnes, L. C. Monahan and others, to develop mines at Summerville. A 50-ton crushing plant is planned.

SONOMA COUNTY.

The discovery of cinnabar ore near Mark West Springs has caused some excitement, and a number of farms have either been bonded or bought. There are also signs of cinnabar in Franz valley at the junction of the Calistoga and Rincon valley roads, where the Sherwood ranch has been sold for mining purposes.

TRINITY COUNTY.

*Red Mountain Mining Co.*—This company, operating a mile from Weaverville, claims to have uncovered an old high river channel of some magnitude.

*Three Peaks.*—T. S. Henderson, president of the Great Western Gold Co., has made first payment and secured a 90-day bond on this mine at Coleridge, for his company Cook & Conant are to superintend the development work.

TUOLUMNE COUNTY.

*Dutch.*—The shaft of this mine is to be sunk 150 ft. deeper from the 1,420 ft. level.

*Starr King.*—Under authority of the owner, W. W. Coe, the former employees and local creditors are running this mine on a co-operative basis, milling the ore and paying the indebtedness.

*Vine Springs.*—This mine has been temporarily closed. As soon as the mill crushes the ore from the dumps the stamps will be hung

## COLORADO.

CHAFFEE COUNTY.

*Granite Mining, Drainage & Transportation Co.*—This company has begun work on a tunnel to connect its mines at Buena Vista. The company owns the Crown Point, Pittsburg, Last Chance, Miltonia, Eureka, Valparaiso and St. Louis Fair claims.

CLEAR CREEK COUNTY.

*Brighton.*—This mine at Freeland is shipping a good tonnage of smelting ore to the smelter.

*Moose.*—At this mine in Elkhorn gulch work has been resumed after an idleness of several years. A new shaft house has been built, and the mine will be thoroughly unwatered.

*Ward.*—At this property grading is being done for a new cyaniding plant. It will consist of six steel tanks, 6 ft. deep and 30 ft. in diameter. The pulp will be handled by gravitation, and all of the mill tailings will be treated with cyanide.

FREMONT COUNTY.

*Dorcas Mining, Milling & Development Co.*—Work has begun on the construction of a slimer addition to this company's mill at Florence.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

*Imperial Mining & Milling Co.*—A steam plant and a modern building are being installed on the Mackey property. The main shaft will be sunk a further depth of 400 or 500 ft. New concentrating tables and crusher are being installed. L. J. Mountz, Apex, is manager.

*Mountain Chief.*—La Kamp, Hurd et al. have taken a lease and bond on this group on Tip-Top Mountain, near Perigo, and are preparing for development. A heavier plant of machinery will be installed. C. La Kamp, Perigo, Colo., is manager.

*Mountain Monarch Mining Co.*—At a meeting held in Denver the following were elected directors: W. Augustus, R. M. Hicks, W. J. Nickell, G. W. Smith, E. S. Gilbert, J. W. Barrow, Frank Huverstuhl and Frank Augustus. The company will work on a more extensive scale on its property in Gambell gulch, and intends to put up a plant for the treatment of its own ores. Frank Augustus, Rollinsville, Colo., is manager.

*Perrin.*—Jones & Stevens, of Russell Gulch, are starting up this claim after a long idleness, and are preparing to work one of the surface shafts.

*Tigress.*—This property on Quartz Hill is being started up by the owners, Messrs. Butler and Thatcher, of Denver, after an idleness of a number of years. G. W. Thatcher, Central City, Colo., is manager. A temporary plant is being installed.

*West Flack.*—A local pool has taken hold of this property on Quartz Hill. Stoping has begun at a depth of 200 ft. Steve Nankervis, stalled. L. J. Mountz, Apex, Colo., is manager.

GUNNISON COUNTY.

*Ærolite.*—A mill to treat the low grade vein is to be erected at this group at Gunnison.

*Maple Leaf.*—This mine at Sillsville is making regular shipments.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

*Coronado.* The shaft has been sunk in the mineral zone, leaving about 30 feet still to be opened.

*Dome.*—A fair body of ore has been opened in this property at Rockhill. It runs 220 ozs. silver and 40% lead to the ton. This property is one of the oldest in the camp and adjoins the La Plata. The ore is a lead carbonate.

*Donovan and Deer.*—The new shaft being sunk on these claims has reached the contact and drifting has been started.

*Green Mountain.*—This mine in Iowa gulch is being worked by E. A. Smith and associates. A tunnel is being driven from the Ontario to connect with the main workings.

*London.*—During the last few months only sufficient ore was taken from this mine to pay the running expenses; now that the roads are in good condition shipments will be increased. The average of the ore shipped holds up to 5 oz. gold per ton.

*Peerless Maud.*—During the week a parallel vein was opened in this property in the Horseshoe district, that runs high in silver. The ore is principally lead, running as high as 50 per cent, and carrying about 12 oz. silver. The property is under lease to Hugh Dyatt.

*Ruby.*—From this mine at Red Mountain in the Twin Lakes district a carload of ore was recently shipped which netted the owners $9,000. The gross value of the car was $11,000. The ore is packed on jacks a distance of four miles to the wagon road, thence by wagon to the railroad at Granite.

*Sunday.*—This mine on Ball mountain at the head of California gulch is shipping a quanaity of fair grade ore.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

*Mining Situation.*—News in mining circles is rather scarce. The large mines are working as usual and regular shipments are made. On the regular monthly pay day a large amount of money was distributed among the miners. A great deal of leasing is going on; many leases are doing well, and new leases are being continually granted. Probably more leasing is being done than at any time in the history of the district. Everything is quiet in labor circles, although some lawlessness by unknown persons has taken place. Probably there are not a dozen members of the Western Federation of Miners at work in the whole district.

*Golden Cycle.*—Nothing new has appeared in this case since the Virginia court reversed its action in the appointment of a receiver. The mine is still shut down. The litigation is due to dissensions among the stockholders.

*Henry Adney.*—A new 7-drill compressor is being installed on this property on Beacon Hill, near the Old Gold ground and the El Paso and C., K. & N. workings. Some ore has been shipped and a new strike has been reported. Mike Burke, of Cripple Creek, is in charge.

***Stratton's Independence.***—A number of lessees are working on this property. It is understood, however, that the leases are not being so much sought after as they were, as the terms are very stiff.

SAN JUAN COUNTY.

*Venetian Mining Co.*—On this company's property at Silverton the Durkee electric drills are making about 7 ft. per day. The Evelyn tunnel, in which the drills are working, is now in 430 ft.

SUMMIT COUNTY.

*Gold Run Mining & Milling Co.*—The crosscut tunnel at this mine at Breckenridge, which is developing a group of some 50 lode claims located near the head of Gold Run, is now in about 2,300 ft.

*Jessie.*—Three additional Wilfley tables are being put in the mill at this mine at Breckinridge, making a total of 12 Wilfley concentration tables at work. Four Shaw pneumatic drills and a Rand air compressor will also be installed. The mill averages from three to four carloads of auriferous concentrate per week.

## IDAHO.

BLAINE COUNTY.

*Crœsus.*—A mill is to be erected at this mine near Hailey.

*Lipman.*—Work is progressing at this group at Hailey.

*Lost Packer.*—It is reported that good ore is being taken from this mine in Loon Creek.

CUSTER COUNTY.

*Werdenhoff Mining & Milling Co.*—A mill and cyanide plant are to be placed on this company's property in the Big Creek district. The main tunnel is in 700 ft.

*White Knob Copper Co.*—This company's smelter at Mackay is treating about 450 tons daily for the company, and 100 tons for other parties. Approximately 400,000 lb. of copper are produced monthly.

## ILLINOIS.

FULTON COUNTY.

(*From Our Special Correspondent.*)

*Maplewood.*—Newsam Bros., of Peoria, are going to equip this mine at Farmington with electric haulage.

MONTGOMERY COUNTY.

*Litchfield Coal Co.*—The plant of this company at Litchfield has been sold by J. D. Crabbe to the Pittsburg Coal Co., for a reported price of $100,000. The mine is considered to be one of the best in the State.

SANGAMON COUNTY.

(*From Our Special Correspondent.*)

*Springfield Co-Operative Coal Co.*—This company, north of Springfield, is putting in a new Robinson fan at the escapement shaft, over a mile from their hoisting shaft. The fan will be operated by electricity, getting power from the city of Springfield.

## INDIANA.

GREENE COUNTY.

(*From Our Special Correspondent.*)

*White Rose Coal Mining Co.*—This new company has a capital stock of $50,000. The principal office will be in Linden, and the place of operation will be in the northeast quarter of the county. Cyrus E. Davis, Francis M. Dugger, J. A. W. Miller and N. G. Nixon are incorporators.

SPENCER COUNTY.

(*From Our Special Correspondent.*)

*Home Mining Co.*—This company has leased several thousand acres of land in three or more townships to be developed at once for coal, oil, gas and clay. Forty-five leases have been filed with the County Recorder. Coal mines are now being worked in a small way on several of the farms. The company's principal office will be in Rockport.

## LOUISIANA.

CALCASIEU PARISH.

(*From Our Special Correspondent.*)

*Jennings Oil Field.*—The Wilkinson Oil & Development Co. has abandoned its well near

Gueydam, after drilling 2,000 ft., and has purchased two acres in the proven field from Heywood Brothers. The Crowley Oly & Mineral Co. has declared a divided of $20,000, the second of that amount in 30 days. Production has increased slightly and demand is good. The yield is holding up well. Two gushers and two pumpers have been brought in since the last report, and 14 new wells started.

W. A. Meagher intends to drill for petroleum east of the big sulphur plant operated by the Standard Oil Co. at Sulphur mine.

## MICHIGAN.

IRON—MENOMINEE RANGE.

*Lake Fumee.*—A plant of machinery for exploration is being moved to this place by Capt. Thomas J. Spencer. The shaft is now down 70 ft., and will be continued another 40 ft.

## MISSOURI.

JASPER COUNTY.

*Pittsburg-Missouri Zinc-Lead Co.*—This newly incorporated company has purchased 130 acres of mining land, one mine west of Joplin from L. H. Cunningham. There are 10 concentrating plants on the property. The officers and directors of the company are as follows: M. K. Salisburg, president; H. L. Baird, secretary and treasurer; George M. Jones, James M. Young, James A. Wilson, C. R. Judd, R. A. Balph, James Balph and William E. Evans, of Pittsburg; H. A. Wolcott, C. B. Wolcott and N. H. Bettis, of Carthage, Mo.

MADISON COUNTY.

*Mine Lamotte, Lead & Smelting Co.*—This company, at Mine Lamotte, is building a new smelting plant. It is to be equipped with a crushing plant for re-handling the accumulated slags.

RANDOLPH COUNTY.

*Randolph Coal & Mining Co.*—This company, a New York syndicate, has purchased 20,000 acres of coal land in the southern part of this county for $600,000. The land is traversed by the Chicago & Alton, Missouri, Kansas & Texas, and Wabash railroads.

ST. FRANCOIS COUNTY.

(*From Our Special Correspondent.*)

*Columbia Lead Co.*—The No. 2 shaft of the Columbia has been closed down, and the No. 1 shaft is only running half time.

*Federal Lead Co.*—This company has resumed prospecting with four diamond drills on its McLaughlin tract on Big River.

*Herculaneum.*—A new blast furnace, the sixth, is being erected at the St. Joe smelter.

*National Lead Co.*—Mr. Bardell, the mechanical engineer of the National plant at Desloge, has been transferred to the new smelter at Collinsville, Ill.

*St. Joe Lead Co.*—Two sections of the new mill at Owl Creek have started, and are treating about 500 tons of rock a day. The other two sections of the mill are nearing completion, and will soon be in commission, giving the mill a total capacity of 1,000 tons per day, which will be obtained from the Hunt and Hoffman shafts. The concentrates are being shipped to Herculaneum for roasting and smelting, and not to the Bonne Terre roasting plant.

STONE COUNTY.

*Galena Smelting & Manufacturing Co.*—The capacity of this company's smelter at Galena has been increased to 750,000 lb. daily, equivalent to 50 per cent.

## MONTANA.

BROADWATER COUNTY.

*East Pacific.*—At this mine, near Winston, work is being carried on in four tunnels. Air drills are used.

*H. & H.*—This mine, near Winston, is to be pumped out and explored.

*Stray Horse.*—This mine, at Winston, has temporarily closed down.

FERGUS COUNTY.

*Maginnis.*—These properties at Lewistown are to be operated after an idleness of 15 years. They are owned by the Conrad-Stanford Co., of Helena, and will be managed by E. H. Crabtree who has bonded them for a reported price of $60,000.

FLATHEAD COUNTY.

*Copper Reward.*—Some rich ore is reported taken from the 400-ft. tunnel of this mine at Cherry Creek.

*Illinois & Montana Mining Co.*—Work on this group in the West Fisher district is to be resumed at once. The property has been idle since last spring.

MADISON COUNTY.

*Mountain Cliff.*—A rich strike is reported at this mine at Mineral Hill.

MISSOULA COUNTY.

*Black Lead.*—Important discoveries of lead carrying high copper values are reported in this district in the Clearwater country.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

*Cataract Copper Mining Co.*—The Colorado Iron Works has begun action against this company to recover a balance of $9,599 on account. The complaint alleges that the plaintiff contracted to furnish the defendant company with a smelting plant for the sum of $51,520. The plant was completed in March last, and there has been paid on the same $42,500. The suit was filed at Boulder.

## NEVADA.

ESMERALDA COUNTY.

*Gold Wedge.*—Sinking to catch the Jumbo shaft has begun at this mine at Goldfield.

*Vernal.*—This group of five claims at Goldfield is reported bonded to Steve Baldwin, of Salt Lake; Frank Keith and John Hays Hammond, of the Tonopah Mining Co., and C. E. Knox, of the Montana Tonopah. The bond runs for six months.

LINCOLN COUNTY.

*Bamberger-De Lamar.*—The mill at De Lamar is handling about 350 tons of ore daily; the monthly output of gold bullion is said to be nearly $65,000.

NYE COUNTY.

*Lookout.*—At this mine in the Red Mountain district the shaft is down 60 ft., and good ore is reported found.

*Tonopah Extension.*—High grade ore is reported in the 400-ft. level of this mine at Tonopah. The foundation is being laid for a new compressor.

## NEW MEXICO.

GRANT COUNTY.

*National Gold Mining Co.*—This company has recently installed a concentrating plant at its mines at Stein's Pass.

*San Simon.*—This group in Stein's Pass has been sold to the Mineral Hill Consolidated Mining Co., of San Francisco. The ore is a carbonate containing lead and silver.

OTERO COUNTY.

*Excelsior Mining Co.*—This company, at Jarilla, is reported to have encountered ore that averages 20 oz. silver per ton.

*Three Bears.*—A new body of ore is reported struck at this mine at Jarilla, at a depth of 400 ft.

SANTA FE COUNTY.

*Gold Bullion Mining Co.*—At the placer mines of this company at Golden a steam shovel and Johnson dry washer are at work, and 600 cu. yd. of dirt daily are handled, averaging 35c in gold per yard.

SIERRA COUNTY.

*Pelican Mining Co.*—The mines and other property of this company have been sold at sheriff's sale. The judgment was in favor of Henry C. Flower, of Kansas City, for $5,436. Mr. Flower bought in the property.

## NORTH CAROLINA.

ROWAN COUNTY.

*Barringer.*—Eight men employed in this mine in Gold Hill were drowned by the flooding of the mine August 11.

## OREGON.

BAKER COUNTY.

*Blue Bird and Buckhorn.*—The machinery for the hoisting and milling plants to be erected in these groups in Sumpter is now in readiness. The mill will contain both rollers and stamps. Work is being carried on in the Blue Bird in drift on No. 2 vein, and a rich body of ore has been opened up. The Buckhorn is being developed through tunnels.

*Center Star.*—This claim at Sumpter has been transferred by H. B. Griffin to L. G. Tilley, manager of the Baby McKee group.

*Commercial Mining & Milling Co.*—This company in Sumpter is building a 24-ton rolling mill for its Rainbow and California mines.

*Dixie Meadows.*—A 40-stamp mill is to be installed at this mine in the Quartzburg district.

*Thornburg.*—These placer mines in the Granite district have been sold to a Chicago syndicate for a reported price of $40,000.

*Valley Queen.*—A large vein of good ore is reported uncovered in this mine at Sumpter.

GRANT COUNTY.

*Black Jack.*—The main crosscut at this mine at Granite is now in 630 ft., and six ledges have been tapped, four of which are said to show values ranging from $6 to $30 per ton.

JOSEPHINE COUNTY.

*Althouse Hydraulic Mining Co.*—The property of this company in Grant's Pass, including full hydraulic equipment, valued at $4,000, has been sold on an execution in favor of Robert Brown and others.

*Eureka.*—This mine at Grant's Pass is steadily producing. Two Layner drills are being used for sinking.

## PENNSYLVANIA.

ANTHRACITE COAL.

*Beaver Brook.*—A modern washery is to be erected at this colliery at Hazleton. It is to prepare the rock and culm banks which have been accumulating at the colliery for many years.

*Lehigh-Wilkes-Barre Co.*—Plans for two new breakers are being drawn. One is to be located at Andenreid, and the other at Honey Brook. The capacity of each will be about 1,500 tons daily.

*Natalie Anthracite Coal Co.*—The property of this company in Northumberland and Columbia counties is to be sold at public auction Oct. 5 at Pittsburg.

*Philadelphia & Reading Coal & Iron Co.*—The fire on this company's mine at Shamokin, which started last May, is declared extinguished.

*Pennsylvania Coal Co.*—Improvements are being made at the No. 6 breaker in Pittston. This necessitates closing down this breaker, and also breakers No. 5 and 11 for about two months.

BITUMINOUS COAL.

*Citizens Coal Co.*—This company has been organized at Johnstown. It has purchased 300 acres of coal in Green hill and Dale borough. The holdings of the Central Coal Co., including the mines in the Eighth ward, the Wertz & Hershberger, Woodvale, Morrellville and Coopersdale mines, and all the holdings of the Central Coal Co.

*H. C. Frick Coal Co.*—Contracts have been let for the 1,000 new coke ovens to be opened by this company in the Connellsville region. There will be three plants. Two of these will be in Georges township, on York run, and the third plant on the Paul farm, behind Elm Grove.

*Westmoreland Coal Co.*—This company is preparing to begin mining operations on the Weddell farm at Rillton. About 200 men are now at work.

## TEXAS.

HARDIN COUNTY.

(*From Our Special Correspondent.*)

*Batson Oil Field.*—The following well have been brought in: Guffey Petroleum Co.; Wing No. 18; John Miller; Cheek & Gilbrough; Cruise & Land.

*Saratoga Oil Field.*—Santa Fe No. 5 well has come in a gusher, and is said to be the best ever drilled in this field. The Colton heirs claim that the well is on their property, and W. H. Turner has been appointed a receiver to take charge of the production pending the judgment of the court. Rio Bravo Oil Co.'s well No. 216 is in, and doing 150 bbl. daily.

JEFFERSON COUNTY.

(*From Our Special Correspondent.*)

*Beaumont Oil Field.*—The Chaison well, two miles northwest of Spindletop, has struck a strong flow of water. The drillers claim to have passed various oil strata, and the pipe will be pulled up to test them. None of the wild-cat wells around Spindletop have found oil in paying quantities. The demand for fuel oil has increased, owing to the opening of gin and sugar mills, and unless some wild-cat well opens a new field, oil will rapidly advance in price. By order of the Circuit Court, all of the extensive property of the Central Asphalt & Refining Co. at Port Neches will be offered for sale at public auction on September 6.

MATAGORDA COUNTY.

*Big Hill Oil & Fuel Co.*—This company has been incorporated with a capital of $96,000, and is drilling a well at Big Hill.

## UTAH.

(*From Our Special Correspondent.*)

*Ore and Bullion Settlements.*—Salt Lake banks reported settlements during the week ending August 12 aggregating $433,000.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

*Blue Jay Extension.*—A strike of copper ore of considerable importance has been made in this property. The pay streak is about 3 ft. wide and assays average 11.5% copper, 6.2 oz. silver and 80c. in gold.

*Newhouse Mines & Smelting Corporation.*—The concrete work for the new concentrator and other buildings is about completed. The extension of the railroad from 'Frisco will soon be in operation.

JUAB COUNTY.

(*From Our Special Correspondent.*)

*Tintic Shipments.*—The shipments of ore during the week ending August 13 aggregated 96 carloads, as follows: Carisa, 4; Mammoth, 12; Grand Central, 6; Lower Mammoth, 1; Salvator, 1; Uncle Sam Con., 1; Yankee Con., 5; Eagle & Blue Bell, 3; Centennial-Eureka, 39; Germini, 11; Bullion-Beck, 4; So. Swansea, 3; Star Con., 3; La Clede, 1; Monterey, 1.

*Mammoth.*—This tintic mine produced about $33,000 worth of ore during the first ten days in August. The operating expenses run from $10,000 to $13,000 monthly. On the 1,900-ft. level a good body of gold-bearing quartz has been opened and shows high values in gold, running about 9 oz. A winze is being sunk on a lead-silver vein from the 800-ft. level.

*Grand Central.*—At this mine the main shaft is being sunk to get under the ore bodies opened on the upper levels. The payment of dividends has been suspended.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

*United States Smelter.*—Shipments of copper bullion for the week ending August 13 aggregated 257,117 pounds.

*Bingham Consolidated.*—The copper bullion shipments for the week ending August 13 aggregated 244,632 pounds.

*Utah Consolidated.*—This plant produced during the week ending August 13, 342,276 pounds of copper bullion.

*Butler-Liberal.*—The main working tunnel is in 820 ft. An upraise of 240 ft. is being made to the surface.

SUMMIT COUNTY.

(*From Our Special Correspondent.*)

*Creole.*—Lessees have encountered some good shipping ore on the 100-ft. level of this property.

*Ontario.*—The new hoisting plant, to replace the one destroyed by fire, is nearing completion.

# FOREIGN MINING NEWS.

## CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

*Boundary Ore Shipments.*—Shipments for the week ending August 6 are as follows, in tons: Granby, 9,000; Mother Lode, 2,496; Emma, 792; Ore Denoro, 66; Mountain Rose, 33; total for the week, 12,387; total for the year, 470,728.

BRITISH COLUMBIA—ROSSLAND DISTRICT.

*Rossland Ore Shipments.*—Shipments for the week ending August 6 are as follows, in tons: Le Roi, 1,500; Center Star, 1,200; Center Star, milled, 480; War Eagle, shipped, 990; War Eagle, milled, 390; Le Roi, No. 2, shipped, 450; Le Roi, No. 2, milled, 300; Spitzee, shipped, 30; Jumbo, 200; Cliff, 370; Velvet-Portland, milled, 250; total, 6,160; total for the year to date, 213,113.

## NEW CALEDONIA.

Exports of ores from New Caledonia for the five months ending May 31, as reported by *Le Bulletin du Commerce*, of Noumea, included 16,693 metric tons of nickel ore, 3,051 tons of cobalt ore and 12,375 tons of chrome ore.

The Société de Chrome is extending its operations at Plum, and is building an extension of its tramway from Prony to the new mines in order to carry the ore which is being developed there on a considerable scale.

The Consolidated Nickel Co. is carrying on development work on an extensive scale at the Etoile du Nord mine, two new adits having been opened. Mr. Powell is in charge of the operations.

The Morachini mine at Koumac is also being actively developed and a large deposit of nickel ore has been opened.

At La Foa work is being actively carried on at the Port Arthur nickel mine. This mine is being worked on the open-cut system. The surface stripping has been completed and oxidized ore is now being taken out, having a low tenor in nickel, but improving as depth increases.

## NEW ZEALAND.

Exports of gold for May and the five months ending May 31 are reported by the Mines Department as follows, in bullion ounces:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| May ..... | 45,521 | 61,325 | I. 15,804 |
| Five months..... | 193,120 | 211,367 | I. 18,247 |

The bullion reported for the five months this year was equal to 189,569 oz. fine gold, or $3,922,723. Exports of silver for the same period were as follows:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| May ..... | 65,739 | 111,477 | I. 45,738 |
| Five months..... | 213,338 | 261,519 | I. 48,181 |

The greater portion of the silver was obtained from the gold mines in Ohinemuri county, in the Hauraki Mining District.

# MINING STOCKS.

(Full quotations given on pages 286 and 287.)

**New York.** Aug. 17.

Speculation has been very quiet; most of the large operators are taking vacation, and only occasionally interfere in the market, so that the small men have had things a good deal their own way. In the industrials, Wall Street has been very busy in circulating rumors about troubles in the steel market, most of them without foundation. United States Steel, however, was more or less affected, but rallied a little at the close, the preferred selling at 69, while the common hangs around 12. Amalgamated Copper gained a little, creeping up to 54½, with a reaction to 43¼.

The other coppers have been practically dead. A little bit of trading was done in British Columbia at $2.62½. Greene Consolidated was quoted around $14@$14.50.

There was a little more trading in the Comstocks. Consolidated California & Virginia sold at $1.10, Savage at 28c., Sierra Nevada 26c. One sale of Brunswick of California was recorded at 20c. for 1,700 shares. Cripple Creek shares were quiet, the only transactions recorded being a small lot of Isabella at 22c., and one of Cripple Creek Consolidated at 8c. Phœnix of Arizona was quoted at 12c., on the curb.

**Boston.** Aug. 16.

(*From Our Special Correspondent.*)

The week in the stock market is one day short, as Boston is witnessing the Grand Army parade to-day, and there is no local stock market, while the banks also made it a holiday. Although there have been no flurries, mining shares have held strong, except in one or two minor cases. The most encouraging feature is the demand and strength witnessed in the better class of securities. Calumet & Hecla, for instance, is up $20, to an even $500, the highest price of the year. Quincy has advanced $3, to $84, and Tamarack $4, to $96. Wolverine has held around $80, and Osceola has advanced $1.62½, to $64.87½. On the other hand, Shannon Copper made a further decline to $3.50, on very heavy offerings. Sales one day last week footed up over 6,000 shares, and the offering was continuous. Official announcements have been made that there is no trouble at the property, although it is probable that there are dissensions in the management.

Allouez has been in steady demand, having risen $2 during the week, to $10.75. There is a very bullish feeling on this stock, on the possibilities when the Kearsarge lode is clipped a month or so hence. Atlantic in sympathy has moved up $1.25, to $11. Isle Royale, which has also been quite a feature, is up $2.37½ for the week, to $14.62½. The better feeling is due to the showing of stamp copper in the shaft section 11, which is adjacent to Isle Royale. Utah Consolidated has been quite a feature, touching $39.87½, a net advance of $1.25 for the week. Copper Range has been in the foreground most of the time, as usual, of late. It has recorded a $2 fluctuation between $55.75 and $53.75. The feeling on this stock is mixed. There are rumors that the pool met considerable stock at the advance and suspended operations in part.

The severe selling pressure in Daly-West seems to be over for the time being, although there is no great rallying power to the stock. Its price has been between $13.75 and $12.25. Dominion Coal recorded a $3 advance, to $51, on light trading. Parrot is $1.25 higher at $25, although the resumption of dividends caused no flurry at all in the stock.

These directors and officers have been appointed for the Mexico Consolidated Mining & Smelting Co.; W. S. McCornick, of Salt Lake City, president; Larkin T. Trull, vice-president; Edward L. White, managing director; Stillman P. Kelly, Spencer W. Richardson, Charles W. Pidd, G. C. Beckmann, of Parral, Mex.; Duncan McVichie, of Salt Lake, consulting engineer, and Frank C. Morehouse is manager at the mines. The company is capitalized for $2,000,000, par $10. A limited amount of stock is being offered for subscription at par. The treasury will contain $175,000. The headquarters are in this city.

**Colorado Springs.** Aug. 12.

(*From Our Special Correspondent.*)

The past week has been rather quiet on the local exchange, and prices of Cripple Creek shares have not materially changed from last week's quotations. A few stocks have made fractional gains, but on the whole the market has remained stationary. The Elkton

mine has installed the new machinery and will be hoisting ore on company account soon.

The exchange has made a new ruling allowing the brokers to deal under the head of "unlisted stocks" in producing mines of good repute, which will permit trading in stocks that have not heretofore been upon the board.

The El Paso drainage tunnel is now flowing 1,300 gal. per minute less than when first opened. It has entirely relieved some mines of water and greatly lowered the level in others.

El Paso sold to-day for 90⅜, being a fractional gain over last week. C., K. & N. sold yesterday for 35c. Work closed at about 9⅜c. Portland sold during the week for $1.67. Elkton is selling around 64. Isabella is quoted at 21c. per share.

**Salt Lake City.** Aug. 13.

*(From Our Special Correspondent.)*

The past week has witnessed some improvement in the condition of the mining stock market, although some of the leading stocks have suffered disastrous declines. Nevertheless, there has been more inquiry than for some time, which is believed to be the forerunner of good business during the fall months. The stocks which have suffered most are Daly-West, Grand Central and a few of the Tonopahs. The drop in Daly-West has been a serious set-back to the local market, but the Bingham coppers have all held up well. Century sold as low as 29½c. during the week. Mammoth has made satisfactory gains.

There was little doing in Tonopah stocks this week, but Goldfield Bonanza was bought freely. It is a cheap stock, selling at 5c. a share, and a good many have looked upon it as worth taking a flyer. Dividends were paid during the week by the Silver King and Annie Laurie, the former for $100,000; the latter for $12,500.

**San Francisco.** Aug. 11.

*(From Our Special Correspondent.)*

The market for the Comstock shares has been comparatively quiet. Demand has not been large and selling has been chiefly among dealers and chippers. Some quotations noted are: Ophir, $2.40; Consolidated California & Virginia, $1.15@$1.20; Sierra Nevada, 21c.; Potosi, 14c. per share.

The sworn returns of the mining companies, as filed in their offices this week, show cash on hand Aug. 1 as follows, with all expenses paid, unless otherwise noted: Andes, $6,330; Alpha, $1,732; Belcher, $2,438, with July expenses partly unpaid; Best & Belcher, $186, with liabilities of $4,000; Bullion, $2.769; Caledonia, $25, with $108 due treasurer and July expenses unpaid; Confidence, $608, with July expenses unpaid; Challenge Consolidated, $3,981; Consolidated Imperial, $580; Crown Point, $4,146; Chollar, $7,748; Exchequer, $4,227; Gould & Curry, $239, with bills receivable of $390; Hale & Norcross, $3,060; Julia Consolidated, $23; Justice, $1,663; Mexican, $163; Ophir, $95,916: Overman, $91, with $773 due treasurer and July expenses unpaid; Potosi, $6,837; Savage, $4,692; Scorpion, $2,069; Silver Hill, $9,288, with bullion valued at $3,600; Standard Consolidated, $91,123, with July expenses and July bullion to be accounted for; Syndicate, $2,695; Union Consolidated, $380, with $1,700 due bank.

The following companies report no cash on hand, with indebtedness as given: Sierra Nevada, $199; Utah Consolidated, $805.

New assessments levied were as follows: Utah Consolidated, 10c. per share, delinquent Sept. 10; Consolidated New York, 5c., delinquent Sept. 15.

On the San Francisco & Tonopah exchange prices were a little easier, and there was apparently less demand for stocks. Montana Tonopah sold at $2.40; Tonopah Midway, 47c.; MacNamara, 38c.; Red Top, 14c. per share.

On the California exchange business in oil stocks was quiet and buyers seemed to be taking very little interest in the market. Hanford sold at $169; Kern Oil, $12; Monte Cristo, 65c.; Independence, 27c. per share.

**Monterey.** Aug. 10.

*(From Our Special Correspondent.)*

Exchange on New York during the week ending Aug. 9, raised from 214¾ to 215¾.

Mining stocks were somewhat more active than of late, and in El Oro, Victoria brought $40; Maria de Oro, $22; Aldebaran, $53 for the assessable, and $74 for the non-assessable: Dos Estrellas, $10.40; Cuauhtemoc, $3; Luz de Borda, $7; Equidad, $20; Santa Rosa, $5, and Ocotes, $4; Buenavista, in Tepic, $175; Barreno, San Luis Potosi, $80, and of Pachuca, San Francisco, $84; Santa Gertrudis, $76; and Soledad, $900.

## COAL TRADE REVIEW.

New York, Aug. 17.

ANTHRACITE.

The anthracite trade shows no signs of immediate relief from the existing midsummer dulness. The fact that such dulness has been a regular feature of the trade up to the strike of 1900 has not been forgotten, but the abnormal conditions of the last few years have tended to make this dulness more irksome this year than it used to be. Generally speaking, dealers at nearly all points are pretty well supplied with coal. There may be a little spurt in buying in the next two weeks to take a last advantage of the August discount, but a 10c. discount is not much of an incentive to the average dealer, who figures that extra cost from handling, insurance, etc., will offset it. The large companies continue to restrict production, the Lehigh Valley having announced its intention of closing all its mines for a week, other companies cut their outputs in one way or another, as is most convenient.

In the Northwest the market is quiet; coal continues to arrive at the lake docks, but the movement from docks is slow. In Chicago territory trade is dull. It seems to be the general opinion that many people who bought liberally a year ago, while the recollections of the great strike were vivid, have this year refrained from buying, and will not buy until colder weather reminds them of the approach of winter. Along the lower lakes and in Canadian territory demand has fallen off and there is now little interest shown in the coal market. Supplies for this fall and winter have for the most part been laid in, and no material change in conditions is to be expected for some weeks. Along the Atlantic seaboard the midsummer dulness is marked. There is little demand for coal, and dealers apparently having sufficient supplies and not caring to buy more. As regards the small steam sizes the situation has not changed. These sizes continue to accumulate on producer's hands, though owing to restrictions of output the accumulation is much slower than it has been.

BITUMINOUS.

According to railroad tonnages, bituminous coal is arriving at Atlantic seaboard points in large amounts, but in the trade there is a general complaint of dull times. This complaint is probably based on the contrast between present conditions and abnormal conditions of 1902 and 1903. It can be said, however, that the poorest grades of coal have been selling at cost, and in some cases below cost. Such grades can be bought now for $2.25 f. o. b. New York harbor shipping port, though it is thought to be a fact that producers of these grades have been striving against the lowest prices named, have not taken them, and of late are reporting a better inquiry. The better grades of coal range upward in price, and producers of specialties are receiving orders enough to keep their mines running nearly full time in a hand-to-mouth way. It is said that the West Virginia shippers are not all living up to the strict letter of the agreement on minimum prices reached at the late meetings. Some people in the trade are reporting that business has improved a little of late and believe this improvement is the beginning of the fall season, while others, apparently believe that fall buying has already been largely discounted.

It is believed that the Pennsylvania Railroad is considering the equalization of freight rates between the regions competing for tidewater business, but of course any change in rates will not be put in effect before next April.

Trade in the Far East is taking a fair amount of coal, but orders with all shippers are scarce at times. Along Long Island Sound trade is quiet. In the eastern part of this territory consumers are reported going over to West Virginia coals on account of price. At New York harbor ports there seems to be less coal under demurrage charges, and offerings are less, but enough coal can be had easily for all needs. In the all-rail trade there is a little more activity, particularly in the Far East, and prices are inclined to be stronger.

Transportation from the mines to tidewater is prompt. Car supply at the mines is up to all demands. The railroads continue to allow cars to go off their main lines to points usually embargoed. In the coastwise vessel market the carriers' association is trying to maintain agreements, but there seem to be vessels enough outside of the association to meet the demands of those shippers refusing charters with association restrictions. We quote current rates from Philadelphia as follows: Providence, New Bedford and Long Island Sound, 60c.; Boston, Portland, Salem and Bath, 75c.; Lynn and Newburyport, 85c.; Portsmouth, 75@80c.; Bangor, 85c.; Saco and Gardiner, 90c. and towages. From New York harbor ports rates are 55@60c. to around Cape Cod; from Norfolk and Newport News, 90c., with carriers' association limitations.

**Birmingham.** Aug. 15.

*(From Our Special Correspondent.)*

The furnace companies with coal mines in Alabama are making an effort to break the strike of the union miners at their collieries and non-union miners will be imported to the district. Last Wednesday the first effort was made to start up the mines with any kind of labor that was to be found. The union organization has been holding its men fairly well, in fact, their president claims that the district organization has had but a dozen or so desertions. The production at the union mines has been rather light so far, but during this week there will be an importation of considerable labor, and it is expected that there will be an increasing output of coal right along. The non-union and convict mines have been working every day, and their output has been increasing right along. The Pratt Coal Co. and the Sayre Coal & Mining Co., with mines along the new branch built by the Louisville & Nashville Railroad Co., are producing something like 100 cars of coal a day. There is a good demand for bunker coal and heavy shipments of coal on the Mexican railroad contract are improving right along, and there is a steady demand in this direction. Fairly good prices prevail for coal, the strike having some effect, notwithstanding that no great amount of the coal mined at the places where the strike is on finds its way to the market, being used almost exclusively in the manufacture of pig iron. There is no great amount of the coal being mined by the commercial operators being sold to the furnace companies, the latter purchasing extra needs in coal and coke from producers in Virginia and West Virginia.

The coke production in Alabama is yet slack on account of the strike. The Sloss-Sheffield Steel & Iron Co. towards the last of the week was able to light up 400 of its ovens and start producing coke again. There is a heavy importation of West Virginia coke right now in this district, three or four of the furnace companies buying freely. The coke can be purchased at very close figures.

In making their efforts to resume operations at the coal mines, the furnace operators offered their old miners a new wage scale, 2.5c. under the old minimum, or 45c. per ton, with the average selling price of pig iron at $9 instead of $8 as before. The maximum remains 57.5c. per ton for mining, but the base is placed with iron at $13.50 per ton against $12. The miners would not listen to the offer.

**Chicago.** Aug. 15.

*(From Our Special Correspondent.)*

The market for anthracite continues very quiet; there is no demand for it either in city or country trade during the vacation season. Toward the last of September some buyers undoubtedly will take advantage of the discount for the month, but in general there will be no actively until the cool weather of autumn sets the minds of householders toward the thought of winter supplies. "The consumer got tired

of buying coal last winter" is the explanation of the present condition of the trade by a leading dealer, and no better explanation has been given. It is certain that there is greater apathy this summer than usually exists, and no signs pointing to activity appear anywhere. Dock receipts of anthracite have been light in the last week, but no anxiety is felt about permanent supplies for the fall or winter.

Sales of bituminous are perhaps a little better than they were last week, though there is no decided change. Products of Indiana and Illinois mines are a little weaker and Eastern coals a little stronger. The packing-house strike is affecting sales of screenings and run-of-mine somewhat, and these grades are in large supply and small demand, comparatively, in consequence of this cause and the natural slackness of the market at this season. Smokeless is firmer, and the demand for prepared sizes is reported especially good. Hocking is steady, and sales are increasing slightly from week to week. Youghiogheny and Pittsburg are variable, the demand fluctuating a good deal, but with no accumulation of supply over demand such as has caused demoralization in the past. All Eastern coals, in fact, are well regulated as regards surplus on track.

Quotations are: Hocking, $3; Smokeless, $2.80@$3; Youghiogheny, $2.90; Indiana and Illinois lump, $1.75@$2; run-of-mine, $1.35@$1.75, and screenings, $1.10@$1.50.

The threshing trade is growing better and to all appearances will be the heaviest in the history of the Chicago wholesale business.

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**Cleveland.** Aug. 16.

(*From Our Special Correspondent.*)

The coal situation has not changed. In the lake trade the carrying market has grown weaker, through the satisfaction of a very large demand. The figures are just now being compiled showing the movement to the end of July, and it is said to indicate a very considerable increase over the same period last year. The demand from the Canadian ports has helped the coal trade in this territory wonderfully and has offset the lighter demand in the up-lake region.

The demand for coarse steam coal in this territory is about as it has been. In some quarters they are talking about an improvement, but it is an intangible sort of a thing, if it exists. The prices hold about as they have been at 90@95c. at mine, for both Ohio and Pittsburg coal.

The slack situation is very weak, and the market has been falling. The ruling price is 25c. at mines, with some mines selling below that figure. The coke situation is reported as strengthening some, but the prices hold about as they have been, at $2 for the best 72-hour foundry coke, and $1.50 for the best furnace coke.

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**Pittsburg.** Aug. 16.

(*From Our Special Correspondent.*)

*Coal.*—The mining conditions in the Pittsburg district remain unchanged, nearly every mine being in full operation, and those of the Pittsburg & Buffalo Co., at Canonsburg and Burgettstown, being operated day and night. President Francis L. Robbins, of the Pittsburg Coal Co., before leaving for a business trip to New York yesterday, said the total amount of coal shipped to the lake ports so far this year is greater than the shipments at this time last year. There is some talk of a combination of independent coal operators, but no steps have been taken to perfect the proposed organization. The price of coal remains unchanged, run-of-mine still being quoted at $1@$1.10 at the mine.

*Connellsville Coke.*—The coke trade shows some improvement this week, the shipments and production being slightly above those of the previous week. Prices are firm at $1.50 for furnace and $1.85@$2 for foundry coke. Contracts were made during the week for about 100,000 tons for delivery the rest of the year. The production last week is given by the *Courier* at 155,079 tons, and the shipments aggregated 8,359 cars, distributed as follows: To Pittsburg and river points, 3,262 cars; to points west of Pittsburg, 3,914 cars; to points east of Connellsville, 1,182 cars.

**San Francisco.** Aug. 11.

(*From Our Special Correspondent.*)

The market continues dull. There has been talk of an increase in prices following the recent consolidation of British Columbia interests, but the competition of fuel oil is too sharp to allow any advance.

Pacific coast coals in large lots to dealers are quoted as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle and Bryant, $6.50; Beaver Hill and Coos Bay, $5.50; white ash, $5.25. For Rocky Mountain coals, ex-car, to dealers, prices are $14 for Colorado anthracite, $11.50 for Castle Gate, Clear Creek, Rock Springs and Sunnyside. Eastern coal is nominal at $14 for Pennsylvania anthracite and $13 for Cumberland. Foreign coal in cargo lots is quoted at $13 for Welsh anthracite, $8.50 for cannel and $7.50 for Wallsend and Brymbo.

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**Foreign Coal Trade.** Aug. 17.

Export trade continues quiet here. The only business on hand just now is for the West Indies.

Messrs. Hull, Blyth & Co., of London and Cardiff, report, under date of Aug. 6, that the reduced output (owing to the holidays) has caused a scarcity of small coals, which are firmer. Otherwise there is no change to report. Quotations at Cardiff are: Best Welsh steam coal, $3.66; seconds, $3.48; thirds, $3.30; dry coals, $3.42; best Monmouthshire, $3.30; seconds, $3.24; best small steam coal, $2.10; seconds, $1.98; other sorts, $1.74.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthsire descriptions are f. o. b. Newport, both exclusive of wharfage, but inclusive of export duty, and are for cash in 30 days, less 2½% discount.

In the freight market there is a slightly better enquiry for the near Mediterranean ports, but the market is otherwise unchanged. Some rates quoted from Cardiff are: Marseilles, $1.20; Genoa, $1.20; Naples, $1.14; Las Palmas, $1.32; St. Vincent, $1.44; Rio, $2.04; Santos, $2.46; Buenos Aires, $1.74.

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## IRON TRADE REVIEW.

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New York, Aug. 17, 1904.

Wall Street has been very busy with steel trade this week, all sorts of reports being based on the Republic Co. billet contract, to which reference was made last week. According to the rumors, a meeting of the billet pool has been held every day this week and the Steel Corporation is about to declare war on the independents, and cut prices to the bone. The greater part of this talk, of course, is pure bosh, designed for immediate effect on the price of Steel preferred. As a matter of fact, no meeting of the billet pool has been held, and none is likely to be called right away. The Republic incident is closed, apparently, and it looks a good deal as if the Steel Corporation was a little in doubt as to its immediate policy. This is no new story, however.

In pig iron, business has been very light, with the exception of one heavy order placed by the contractors for the Hudson river tunnel of the Pennsylvania Railroad, the particulars of which are given in our Pittsburg letter. While there is more or less fall business in sight, buyers of pig are not convinced that prices have reached bottom, and are accordingly holding back. It is the old story; nobody wants to buy on what looks like a falling market. A small turn might bring out a good deal of business, but just now the problem is where the turn is to come from.

In finished material the story is very much the same. In the West there has been a little spurt in bars. On the other hand, the strike and lockout in the New York building trades promises very badly for structural material. Bridge work still hangs fire and the railroads are persistently keeping out of the market as far as possible.

In brief, we are continually told of a coming improvement in the market, and of prospective heavy buying; but the authors of these predictions do not specify just where the business is coming from. Meantime, the market is generally very dull.

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*Pig Iron Production.*—The number of coke and anthracite furnaces reported in blast on Aug. 1 was 164, having a total weekly capacity of 246,100 tons. This is 26,100 tons less than the capacity reported on July 1. The estimate of the *Iron Age* puts the production of anthracite and coke iron in July at 1,082,800 tons. To this is to be added 35,500 tons for charcoal iron, making a total of 1,118,300 tons.

Unsold stocks reported on Aug. 1 amounted to 667,166 tons, showing an increase of 46,322 tons during July.

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**Birmingham.** Aug. 15.

(*From Our Special Correspondent.*)

The pig iron production in Alabama is somewhat improved over what it was last week, two furnaces having been started up, and preparations are being made for two others to commence making iron this week. The Tennessee Coal, Iron & Railroad Co. resumed operations at the Oxmoor furnace, coke for the plant being purchased in Virginia. The Alabama Consolidated Coal & Iron Co. during the past week resumed operations at one of the Ironaton furnaces and will start the other Ironaton furnace and Gadsden furnace during the week. This company signed the temporary contract with the union miners. The Woodward Iron Co., the Republic Iron & Steel Co. and the Tennessee Co. will make efforts to resume operations at one furnace each at least this week. There is a good demand for pig iron in this section, and No. 2 foundry still holds firm at $9.50 per ton. The sales are pretty lively right now, aggregating the production, hence the effort to increase the production. The furnace companies, with the exception of the Alabama Consolidated Co., which signed the temporary contract with the miners, are fighting the union and are making efforts to start up their coal mines with non-union labor. The Tennessee Coal, Iron & Railroad Co., the Sloss-Sheffield Steel & Iron Co., the Lacey-Buek Iron Co., the Woodward Iron Co., and the Tutweiler Coal & Iron Co. have all declared intentions of running their coal mines as "open shop," without union labor. The Sloss-Sheffield Co. has succeeded in keeping six out of seven furnaces in steady operation. This company has non-union and convict mines in this State. The Tennessee Co. had five furnaces at Ensley running steadily, with preparations on for one of their Bessemer furnaces to start up during the next few days. The Republic Co. has been able to keep one furnace at Thomas in blast, coal being purchased from an independent and non-union coal mine. The Lacey-Buek and the Tutweiler have been keeping each one furnace going. The Woodward Co. will try to start a furnace this week, one of their mines opening up as "open shop." The Shelby Iron Co., manufacturing charcoal iron, has one furnace in blast. The Lookout Mountain Iron Co., with a new furnace at Battelle in DeKalb county, will be a little delayed in getting the furnace started.

The following iron quotations are given: No. 1 foundry, $10; No. 2 foundry, $9.50; No. 3 foundry, $9; No. 4 foundry, $8.50; gray forge, $8@$8.50; No. 1 soft, $10; No. 2 soft, $9.50.

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**Chicago.** Aug. 15.

(*From Our Special Correspondent.*)

Sales of pig iron continue good, and prices hold up stiffly on both northern and southern. Northern is showing greater activity than southern, and only three furnaces in the Chicago district are out of blast—the Thomas furnace at Milwaukee, the Spring Valley furnace in Wisconsin, and one of the South Chicago Furnace Co.'s stacks. The price of northern No. 2 is $13.50@$14, with a shading of 25c. on the largest orders. For the last two or three weeks the Illinois Steel Co. has been putting 150 tons of foundry iron a day on the market, and this has excited apprehensions that the company intended to go into the manufacture of foundry iron to such an extent as to compete strongly with southern iron. Representatives of the company, however, say no radical change is contemplated for the immediate future.

Southern No. 2 brings $9.50@$9.75, Birmingham, or $13.15@$13.40 Chicago, on most transactions, with 25c. under or over these quotations for exceptional orders. Sales are running well into the first quarter of 1904, and the size of the average sale is increasing. Everything considered, the outlook is encouraging, and a feeling of renewed confidence is being expressed by both sellers and users of iron.

Coke continues firm, the supply being well regulated to the demand, which is not great. Connellsville is quoted at $4.65@$4.75 per ton.

**Cleveland.** Aug. 15.

(*From Our Special Correspondent.*)

*Iron Ore.*—The movement down the lakes is very light, and the boats are abundant. The result has been that the rates from the head of the lakes fell 5c. to 65c. during the week. The rates from the other ports have not changed. The carrying charges are now 65c. from Duluth; 60c. from Marquette and 50c. from Escanaba. These rates are lower than they have been for at least seven years. The movement from the lake docks to the furnace stock piles is light.

*Pig Iron.*—The market shows some little improvement as to current buying of foundry, and also some better movement on contract material. The prices are inclined to stiffen some, and the recent quotations are now the minimum. They are $11.75 in the Valleys for No. 2 for spot shipment and $12 for the same grade for contract shipment. Most of the producers are holding for 25c. higher. There is some little buying extending into next year, but it does not amount to much. The call for malleable, at $12 in the Valleys, is heavier; the market for basic and bessemer has been fair but seems to have eased off.

**New York.** Aug. 17.

*Pig Iron.*—The market continues to show improvement in inquiries and small orders. For northern iron we quote: No. 1 foundry, $14.50 @$15; No. 2X, $14; No. 2 plain, $13.50; forge, $12.50@$13. For Southern iron on dock prices are about as follows: No. 1 foundry, $13.50@ $13.75; No. 2 foundry, $13@$13.25; No. 3 foundry, $12.50@$12.75; forge, $12@$12.25; No. 1 soft, $13.50@$13.75; No. 2 soft, $13@$13.25.

*Bar Iron and Steel.*—Refined bars are still quoted at 1.45@1.49c., in large lots, with steel at the same figure. Common iron bars can be had for 1.35c. per pound.

*Plate.*—The market for steel plate is fairly firm, but limited to small orders. Prices are on a basis of 1.745c. for ¼ in. in carloads.

*Steel Rails.*—Quotations remain $28 for standard sections, f. o. b. mills. Light rails are quoted f. o. b. eastern Pennsylvania mills, as follows: 12-lb., $27; 20-lb., 25-lb., 30-lb., and 35-lb., $25; 40-lb. and 45-lb., $24.

*Structural Material.*—The labor troubles continue the most important factor in the local market. Large lots at tidewater are still quoted nominally at 1.75@2c. for beams, angles and channels.

**Philadelphia.** Aug. 17.

(*From Our Special Correspondent.*)

*Pig Iron.*—The only reason for anticipating some business in pig iron is the very low condition of stocks, and the fact that our manufacturers are booking a fair share of autumn business. The buying will probably result in a hand-to-mouth way, as most of the business has been done for a year past. Southern iron has ceased to make any impression. Local furnace interests are on the warpath for business. Conditions are entirely too much unsettled to make predictions worth while. Stocks in consumers' hands are low. Foundry work drags. Mills are not more than half busy. In view of all these facts, it is necessary to record a dull week and the prevalence of pessimistic views. Prices vary, but the nearest to selling prices, according to a list revised by several dealers, is as follows: No. 1X foundry, $15; No. 2X foundry, $14.50; No. 2 plain, $13.50; forge, $13.25; Southern 2X (rail.), $14; basic, $13; low phosphorus, $17.50@$18.

*Billets.*—The market is dull, but there are consumers in this territory willing to buy as soon as they see their way clear. The impression prevails that billets are on a toboggan, and nothing can induce any one to do business at present. A few small lots sold, but big buyers refuse to take hold at $24.

*Merchant Bar.*—We are doing a good retail business in the stores. A great deal of building is under way, and the country iron stores are working off assorted lots rapidly. Big orders are lacking. Bars are as low as they can get and manufacturers have ceased to extend inducements. The base price is about 1.50c.

*Nails.*—Nails are active, in both wire and steel at the reduced rate.

*Sheet.*—A few orders for heavy sheet came in on Monday and figures are held firmly.

*Merchant Steel.*—Merchant steel supplies have run low both in stores and among users, and there is no disposition shown at this time to buy.

*Pipes and Tubes.*—Business in both lines is very light. We are in the dead of summer.

*Plates.*—The plate mills are fairly busy, and the larger buyers have quite a lot of specifications.

*Structural Material.*—Things look better in this branch. A good deal of small bridge work is coming in.

**Pittsburg.** Aug. 16.

(*From Our Special Correspondent.*)

The many rumors growing out of the Pittsburg Steel Co.'s billet conversion deal with the Republic Iron & Steel Co. have been very annoying to the steel interests here. Its importance has been greatly exaggerated, according to some statements made, and at no time, it is asserted, has the billet pool been threatened with disruption on account of the transaction. The talk has disturbed conditions to a certain extent, but little new business of any consequence is recorded. At least little information regarding sales has been given out within the past few days. The meeting of the billet pool, noted last week, was attended by the leading interests composing it, and at the close the announcement was made that the Republic deal was a closed incident. Reports from Wall Street, and they were quite numerous, had meetings of the pool called for every day last week except Saturday, and none was held except that of Tuesday last. Another Wall Street rumor was that the United States Steel Corporation had decided to buy the Bessemer steel plant of the Republic Co. in order that it might fill the Pittsburg Steel Co.'s billet contract. All of these reports were without foundation. The Republic Co. yesterday started several additional mills at its plants in the Valleys, and is reported to be in the market for scrap, and may make some large purchases this week. The Carnegie Steel Co. made a start yesterday at its steel hoop plant in Youngstown by the resumption of four of the continuous mills. The men who went to work are under contract, and some of them are members of the Amalgamated Association of Iron, Steel & Tin Workers. As a wage agreement has not been entered into with the association, some difficulty was expected, but President T. J. Shaffer instructed the members not to violate their contract. It is believed other Amalgamated men will return to work at the company's terms, and the hoop plants that were operated under the Amalgamated scale last year will be declared open. The company has announced that it will not make a fight against the association, but will employ all of its old men under the new scale, and will enter into an agreement with the association as heretofore if it will accept the scale. The resumption at additional mills of the Republic Iron & Steel Co. seems favorable to a continuance of last year's iron wage scale. The question of a reduction of 15 per cent at the request of the Republic was submitted to a board of conciliation under an agreement with the Amalgamated Association. After considerable delay, both sides selected a representative, but the two have made no effort to get together and name a third person. The workers do not object to the delay, as the present scale is the best they would get if a decision was given in their favor.

The Pearson Engineering Co. has placed contracts for the pig iron to cover the remainder of its castings for the New York tunnel work, amounting to 54,000 tons, divided equally between M. A. Hanna & Co. and Rogers, Brown & Co. The iron will be produced at furnaces at Sharpsville, Pa., and Tonawanda, N. Y. The price of the Valley iron netted the furnace $11.85. Deliveries on this iron will extend over a period of a year and a half.

*Pig Iron.*—Besides the Pearson contract, mentioned above, a number of small orders for all grades of pig iron were placed during the week, but the total tonnage will not exceed 3,000 tons. Prices named this week are as follows: Bessemer, $12 for third and $12.25 for fourth quarter at Valley furnaces; basic, $12.60 @$12.75, Pittsburg; foundry No. 2, $12.85@$13, Pittsburg, and gray forge, $12, Pittsburg.

*Steel.*—There have been no sales of billets, and it is believed some concession could be obtained from the pool price of $23. Steel bars continue to be quoted at 1.35c. and plates at 1.60c.

*Sheets.*—There is some activity in the sheet market compared with the conditions of the past few months, and prices seem to be firm. No. 28 guage black sheets are quoted at 2.10c. and galvanized at 3.10@3.15c.

*Ferro-Manganese.*—The market remains about the same as last week, 80% domestic being quoted at $41.50 per ton.

## CHEMICALS AND MINERALS.

(Other prices of chemicals will be found on page 288.)

New York, Aug. 17.

The market for heavy chemicals is generally quiet. Recent advances for high-test domestic alkali and caustic soda are firmly held.

*Cyanide.*—Prices continue easy, 18@19c. per lb. f. o. b. New York being quoted, although a shade less would doubtless be accepted on a large contract.

*Bleaching Powder.*—Forward inquiry continues fairly good at regular contract prices—$1.20@$1.25 per 100 lb. for prime brands.

*Copper Sulphate.*—New orders are rather more numerous; the quotation, $4.75@$5 per 100 lb., remains unchanged.

*Acids.*—There is nothing further to be heard about the proposed advance in nitric acid. Trade is rather quiet in most lines.

We quote below per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

| | | | |
|---|---|---|---|
| Muriatic, 18° | $.150 | Oxalic, com'l | $5.10@$5.50 |
| Muriatic, 20° | 1.60 | Sulphuric, 50° | |
| Muriatic, 22° | 1.75 | bulk, ton | 13.50@14.50 |
| Ni Æic, 36° | 4.50 | Sulphuric, 60° | 1.05 |
| Nitric, 38° | 4.75 | bulk, ton | 18.00@20.00 |
| Nitric, 40° | 5.00 | Sulphuric, 66° | 1.20 |
| Nitric, 42° | 5.50 | bulk, ton | 21.00@23.00 |

*Brimstone.*—Quiet. Shipments of Sicilian best unmixed seconds are quoted at $21.625@ $21.75, and sales of domestic have been made at about the same price. There is still a good deal of talk about the supplies of domestic sulphur.

Messrs. Emil Fog & Sons' monthly market report says: In June exports to the United States decreased considerably, being 4,500 tons against 13,000 tons last year. The Louisiana mines, after conquering the western markets, are also invading the eastern seaports. At New York a steamer arrived selling at $21.65. Their quality is excellent, equal to our refined, perhaps. This American competition, becoming very visible, may finally awake our competent men.

The contract of the Sicilian combination will expire in June, 1906. The company is making efforts for its renewal, especially by offering advances to the mine-farmers, for a prolongation of another 10 years. Those conversant with Sicilian mining know how risky this is. These sacrifices which the Sicilian combination now seem willing to make, if only part had been made by them two years ago by making some concession to a small number of Scandinavian and German paper mills specially favorably situated, which very reluctantly were treating for the costly pyrite burners, thus preventing the loss of these, our best customers, Sicily would have felt grateful, and a renewal of the contract would generally have been approved. A feeling of latent discontent is creeping in. Sicily made the sacrifice of the export duty to enable her brimstone to compete with pyrites. Despite of their immense profits, the Sicilian combination is continually raising

prices, thereby curtailing our export. Under such circumstances the renewal of the contract has become impossible.

*Pyrite.*—Non-arsenical ore continues in demand at 12@13c. per unit of sulphur, and domestic lump ore at 10@10.5c. per unit and fines, 9c. Spanish pyrite contains from 46@52% sulphur and domestic 42@44%.

*Nitrate of Soda.*—This market maintains its strength. Spot goods are quoted at $2.17½ per 100 lb. for 96%; futures, $2.21½@$2.25, according to position. For 95% quotations are $2.15 for spot, $2.20@$2.22½ for futures.

Above quotations are for 96%, 95% can be had at from 2½c. to 5c. cheaper. Deliveries this year show an increase of 13,438 tons.

*Sulphate of Ammonia.*—Dull and easy at $2.95 per 100 lb. for spot gas-liquor, and $3@$3.05 for shipment.

*Phosphates.*—Little new business is reported. Miners, however, are generally busy on season contracts.

Ocean freights are as follows, per ton:

| Ports. | Florida. | So.Car. | Bone,Algeria. | Sfax, Tunis. |
|---|---|---|---|---|
| Baltic | $3.36@3.62 | ..... | .... | $2.16 |
| Continental. | 3.12 | ..... | $1.44 | 1.80@1.86 |
| Mediter'nean | 3.36 | $2.88 | 2.04 | 2.28 |
| U't'd King'm | 3.00 | 2.64@2.76 | .... | 1.80 |

Charters are few, while shipowners are inclined to steady their rates.

Phosphates are quoted as follows, per ton:

| Phosphates. | F. o. b. | C. i. f. Gt. Britain or Europe. |
|---|---|---|
| *Fla., hard rock, 77@80% | $7.25@$7.50 | $10.53@11.70 |
| land pebble, 68@73% | 3.75@ 4.00 | 7.70@ 8.40 |
| †Tenn., 78@80% | 4.00@ 4.25 | 10.27@10.67 |
| 78% | 3.75@ 4.00 | ..... |
| 75% | 3.25@ 3.50 | ..... |
| ‡So. Car. land rock | 3.25@ 3.50 | ..... |
| river rock, 55@60% | 3.00@ 3.25 | 6.33@ 6.56 |
| Algerian, 63@70% | .... | 6.93@ 7.59 |
| 58@63% | .... | 6.15@ 6.60 |
| 53@58% | .... | 5.05@ 5.20 |
| Tunis (Gafsa) | .... | 6.33@ 6.50 |
| Christmas Isle, 80@85% | .... | 12.87@14.11 |
| Ocean Isle, 82@88% | .... | 13.60@14.45 |
| Somme, Fr., 70@75% | .... | 10.63@11.02 |
| Bordeaux, Fr., 60@65% | .... | 7.60@ 7.72 |
| 55@60% | .... | 6.44@ 6.55 |
| Liege, Bel., 60@65% | .... | 7.00@ 7.10 |

*F. o. b. Florida or Georgia ports. †F. o. b. Mt. ‡Pleasant On vessel, Ashley River, S. C.

## Liverpool. Aug. 4.

(*Special Report of Joseph P. Brunner & Co.*)

While the chemical trade is not brisk, there is, at the same time, a quiet but steady trade passing.

Soda Ash firm at the usual range as to market. For tierces, nearest range may be called about as follows: Leblanc ash, 48%, £5 to £5 10s.; 58%, £5 10s. to £6 per ton; ammonia ash, 48%, £4 5s. to £4 10s.; 58%, £4 10s. to £4 15s. net cash. Bags, 5s. per ton under price for tierces. Soda crystals in demand at generally £3 7s. 6d. per ton, less 5%, for barrels, or 7s. less for bags, with special terms for a few favored markets. Caustic soda in fair export request, and prices firm as follows: 60%, £8 15s.; 70%, £9 15s.; 74%, £10 5s.; 76%, £10 10s. per ton, net cash. Special quotations for export to the Continent and a few other quarters. Bleaching powder in steady demand for home consumption, but for export, orders are coming in rather slowly. For hardwood, £4 5s. to £4 10s. per ton, net cash, is about nearest spot range. For home trade contracts over 1905, manufacturers are now prepared to entertain business at £4 7s. 6d. to £4 10s. per ton, net cash, for softwood packages free on cars at works, Chlorate of potash has been advanced, makers now quoting 3d to 3¼d per lb. net cash, according to quantity and market. Bicarbonate of soda receives a fair amount of attention from buyers and is steady at £6 15s. per ton, less 2½%, for the finest quality in one cwt. kegs; with usual allowances for larger packages, also special terms for a few favored markets. Sulphate of ammonia is quiet, and in spite of being only in moderate supply, quotations are rather easier at about £12 to £12 2s. 6d. per ton, less 2½%, for good grey 24@25% in double bags f. o. b. here. Nitrate of soda is rather dearer on spot, holders quoting from £10 7s. 6d. up to £10 12s. 6d. per ton, less 2½%, for double bags f. o. b. here, according to quality.

# METAL MARKET.

New York, Aug. 17

## Gold and Silver Exports and Imports,

At all United States Ports in July and Year

| Metal | July 1903. | July 1904. | Year 1903. | Year 1904. |
|---|---|---|---|---|
| Gold: | | | | |
| Exports | $9,117,758 | $1,083,749 | $40,453,999 | $69,532,642 |
| Imports | 4,631,207 | 8,925,418 | 18,607,261 | 56,689,144 |
| Excess | E. $4,486,551 | I. $7,842,169 | E. 21,846,738 | E$12,843,498 |
| Silver: | | | | |
| Exports | 3,015,426 | 4,534,514 | 20,520,765 | 30,902,213 |
| Imports | 2,564,217 | 1,381,017 | 12,545,511 | 15,156,617 |
| Excess | E. $451,209 | E. 3,153,497 | E. $7,975,254 | E$15,745,596 |

These exports and imports cover the totals at all United States ports. The figures are furnished by the Bureau of Statistics of the Department of Commerce and Labor.

## Gold and Silver Exports and Imports, New York.

For the week ending August 13th and for years from January 1st.

| Period. | Gold. Exports. | Gold. Imports. | Silver. Exports. | Silver. Imports. |
|---|---|---|---|---|
| Week | $3,008,377 | $8,550 | $745,245 | $3,324 |
| 1904 | 66,741,579 | 3,661,385 | 25,054,124 | 595,068 |
| 1903 | 2,162,749 | 3,628,282 | 12,584,348 | 1,283,695 |
| 1902 | 24,004,088 | 1,521,145 | 15,739,324 | 807,964 |

The gold exported this week went nearly all to Cuba; the silver to London.

The statement of the New York banks—including the 56 banks represented in the Clearing House—for the week ending August 13, gives the following totals, comparisons being made with the corresponding week of 1903:

| | 1903. | 1904. |
|---|---|---|
| Loans and discounts | $908,345,600 | $1,096,491,400 |
| Deposits | 903,335,300 | 1,207,132,500 |
| Circulation | 43,930,300 | 38,293,500 |
| Specie | 178,630,900 | 276,854,900 |
| Legal tenders | 76,766,500 | 82,659,700 |
| Total reserve | $247,397,400 | 359,514,600 |
| Legal requirements | 225,833,825 | 301,783,125 |
| Balance surplus | $21,593,575 | $57,531,475 |

Changes for the week this year were increases of $1,422,635 in surplus reserve, $1,014,500 in loans, $3,686,700 in specie, $2,919,100 in deposits; decreases of $1,534,300 in legal-tenders and $348,000 in circulation.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding date last year:

| | 1903. Gold. | 1903. Silver. | 1904. Gold. | 1904. Silver. |
|---|---|---|---|---|
| N. Y. Ass'n | $178,630,900 | ..... | $276,854,900 | ..... |
| England | 176,362,180 | ..... | 174,912,145 | ..... |
| France | 510,714,170 | $224,865,440 | 539,632,340 | $224,324,280 |
| Germany | 171,345,000 | 60,205,000 | 166,905,000 | 58,645,000 |
| Spain | 73,020,000 | 100,500,000 | 73,745,000 | 101,140,000 |
| Netherlands | 19,703,500 | 32,334,500 | 27,398,500 | 32,203,500 |
| Belgium | 15,060,000 | 7,530,000 | 15,706,665 | 7,853,435 |
| Italy | 95,160,000 | 11,520,000 | 90,650,000 | 15,882,500 |
| Russia | 412,385,000 | 44,760,000 | 473,975,000 | 43,290,000 |
| Austria | 227,300,000 | 64,550,000 | 231,535,000 | 60,305,000 |

The returns of the Associated Banks of New York are of date of Aug. 13 and the others Aug. 11, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chifley gold. The Bank of England reports gold only.

Silver has been dull on limited demand, the India Government being the chief buyer, the Bazaars not operating. The market closes weak on selling by China.

The United States Assay Office in New York reports receipts of 82,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to August 4 are reported by Messrs. Pixley & Abell's circular as follows:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| India | £3,618,626 | £6,297,138 I. | £2,678,512 |
| China | 256,499 | 372,722 I. | 116,223 |
| Straits | 577,779 | 58,103 D. | 519,676 |
| Total | £4,452,803 | £6,727,963 I. | £2,275,160 |

Receipts for the week were £164,000 from New York and £68,000 from Australia. Exports were £277,500 to India.

Indian exchange has ben somewhat firmer, and the council bills offered in London were taken at an average of 16.02d. per rupee. Money is abundant in India, and the demand for silver there continues good.

## Prices of Foreign Coins.

| | Bid. | Ask |
|---|---|---|
| Mexican dollars | $0.45⅝ | $0.47½ |
| Peruvian soles and Chinese pesos | .41½ | .43½ |
| Victoria sovereigns | 4.86 | 4.87 |
| Twenty francs | 3.88 | 3.92 |
| Spanish 25 pese | 4.78 | 4.82 |

# OTHER METALS.

## Daily Prices of Metals in New York.

| August. | Copper. Lake, Cts. per lb. | Copper. Electrolytic, Cts. per lb. | Copper. Cathodes, Cts. per lb. | Copper. London, £ per ton. | Tin, Cts. per lb. | Lead, Cts. per lb. | Spelter. New York, Cts. per lb. | Spelter. St. Louis, Cts. per lb. |
|---|---|---|---|---|---|---|---|---|
| 11 | 12⅜@12½ | 12⅜@12⅝ | 12 @12⅛ | 56 7/16 | 27½ | 4.10 | 4.85 | 4.70 |
| 12 | 12⅜ " 12½ | 12⅜ " 12⅝ | 12 " 12⅛ | 56 9/16 | 27½ | 4.10 | 4.85 | 4.70 |
| 13 | 12⅜ " 12½ | 12⅜ " 12⅝ | 12 " 12⅛ | .... | 27½ | 4.10 | 4.85 | 4.70 |
| 15 | 12⅜ " 12½ | 12⅜ " 12⅝ | " 1 ⅛ | 56¾ | 27½ | 4.10 | 4.85 | 4.70 |
| 16 | 12⅜ " 12½ | 12⅜ " 12⅝ | 12 " 12⅛ | 57 | 27 | 4.10 | 4.85 | 4.7 |
| 17 | 12⅜ " 12½ | 12⅜ " 12⅝ | 1 " 12⅛ | 57⅛ @ 57 | 27 | 4.10 | 4.85 | 4.70 |

London quotations are per long ton (2,240 lb.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wire-bars.

SILVER AND STERLING EXCHANGE.

| August | Sterling Exchange. | Silver. New York, Cents. | Silver. London, Pence. | August | Sterling Exchange. | Silver. New York, Cents. | Silver. London, Pence. |
|---|---|---|---|---|---|---|---|
| 11 | 4.88½ | 58⅛ | 26 3/16 | 15 | 4.88½ | 57⅞ | 26⅛ |
| 12 | 4.88½ | 58⅛ | 26⅛ | 16 | 4.88 | 57⅝ | 26⅛ |
| 13 | 4.88½ | 58 | 26 1/16 | 17 | 4.8795 | 57⅜ | 26⅛ |

New York quotations are for fine silver, per ounce Troy. London prices are for sterling silver .925 fine.

*Copper.*—During the week under review the market has been quite active, and there is a strong undertone. With consumption in this country showing signs of improvement, stocks in manufacturers' hands continue low, and frequent purchases have to be made for early delivery. Some of the lake companies have been rather free sellers, whilst producers of electrolytic copper have rather shown an inclination to hold back with offers. The closing quotations are given as 12⅜@12⅝ for Lake copper; 12¼@12½ for electrolytic in ingots, cakes and wire bars, 12@12¼ in cathodes; 12@12⅛ for casting copper.

The speculative market in London, which had been depressed owing to political trouble, also shows an improvement. Standard copper, which closed last week at £56 13s. 9d., opened on Monday at £56 15s., and the closing quotations on Wednesday are cabled as £57 2s. 6d.@£57 3s. 9d. for spot, £57 2s. 6d.@£57 3s. 9d. for three months.

Refined and manufactured sorts we quote: English Tough, £59 15s.@£60; Best Selected, £60 15s.@£61; Strong Sheets, £69 10s.@£70; India Sheets, £67 10s.@£68; Yellow Metal, 6@6⅛d.

Exports of copper from New York and Baltimore for the week ending August 6 were 6,564 long tons in all. Imports of copper at New York for the week were 422 long tons. Imports of copper ore were 2,850 tons, valued at $7,125.

For the week ending August 13, the exports of copper from New York and Baltimore were 4,524 long tons. Imports at New York were 79 tons fine copper, and copper ore valued at $22,840 in all—quantity not reported.

Statistics for the first half of August show a decrease in the visible supplies of 600 tons. There has been a good demand from abroad, and exports continue large. The English production of sulphate of copper during the pres-

ent year is estimated at 70,000 tons, being equal to about 17,500 tons of copper. The conclusion of commercial treaties between Germany and Russia is expected to stimulate consumption in the former country still further.

Imports and exports of copper in Germany for the half-year ending June 30 were as follows, in metric tons:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| Imports | 41,178 | 53,416 I. | 12,238 |
| Exports | 2,503 | 1,822 D. | 681 |
| Balance | 38,675 | 51,594 I. | 12,919 |

Imports of copper ore were 5,823 tons in 1903, and 3,525 tons in 1904, a decrease of 2,298 tons. Exports of ore were 8,293 tons in 1903, and 9,188 tons in 1904, an increase of 895 tons this year.

*Tin.*—The consumptive demand has been steady throughout the week, without any special feature. The Dutch Government announces that the quantity of Banka tin to be put up for auction during 1905 will amount to 200,000 pikuls, being an increase of about 600 tons, compared with the current year. The closing quotations are 27c. for spot and futures.

The foreign market, which closed last week at £122 5s., opened on Monday at £122 10s., declined on Tuesday to £121 12s. 6d., and the closing quotations on Wednesday are cabled as £121 10s.@£121 11s. 3d. for spot, £122 2s. 6d. @£122 3s. 9d. for three months.

*Lead.*—The market showed more activity during the past week, and there was a tendency on the part of consumers to buy lead more freely for forward delivery than has been the case for some time. The metal seems to again be getting scarce for forward delivery. The ruling quotations are 4.10 New York, 4.02½ St. Louis.

The foreign market is firm, Spanish lead being quoted at £11 16s. 3d., English lead, £11 18s. 9d.

*St. Louis Lead Market.*—The John Wahl Commission Co. telegraphs us as follows: Lead is quiet and demand rather light. Missouri brands are selling at 4c. and desilverized lead at 4.02½c., East St. Louis basis.

Imports and exports of lead in Germany for the half-year ending June 30 were, in metric tons:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| Imports | 23,087 | 31,353 I. | 8,266 |
| Exports | 14,161 | 12,370 D. | 1,791 |
| Balance | 8,926 | 18,983 I. | 10,057 |

Imports of lead ores were 42,203 tons in 1903, and 44,626 tons in 1904, an increase of 2,423 tons this year.

*Spelter.*—The market this week has been very steady, indeed, and prices fluctuated within very narrow limits. Consumptive demand remains satisfactory. The closing quotations are given as 4.70 St. Louis, 4.85 New York.

The foreign market is strong, good ordinaries being quoted at £22 5s., specials, £22 10s.

*St. Louis Spelter Market.*—The John Wahl Commission Co. telegraphs us as follows: Spelter presents no novelty. The nominal quotation is 4.72½, East St. Louis, but neither buyers nor sellers show any anxiety to do business.

*Silesian Spelter Market.*—Herr Paul Speier writes from Breslau, under date of July 30, that inquiry has been good both for domestic trade and for export. The current quotation is 22.25 marks per 50 kg., f. o. b. cars. Breslau, for ordinary brands, and 22.50 marks for specials. This is equal to 4.86c. per pound. Exports for the first half of the year show an increase of 988 tons. The chief items were 12,032 tons to Great Britain, 8,763 tons to Austria, 4,490 tons to Russia, 1,448 tons to Italy, 1,297 tons to France and 978 tons to Japan.

Zinc-dust has been in fair demand. Quotations are 41.25@41.75 marks per 100 kg., f. o. b. Stettin. This is equal to 4.48c. per pound.

Imports and exports of spelter in Germany for the half-year ending June 30 were as follows, in metric tons:

| | 1903. | 1904. | Changes. |
|---|---|---|---|
| Exports | 30,693 | 32,420 I. | 1,727 |
| Imports | 11,146 | 10,158 D. | 988 |
| Balance | 19,547 | 22,262 I. | 2,715 |

Imports of zinc ores were 27,423 tons in 1903, and 43,946 tons in 1904, showing an increase of 16,523 tons this year.

*Antimony* is quiet and unchanged. We quote: Cookson's, 7@7⅜; Hallett's, 6⅝@6¾; U. S., French, Italian, Japanese, Hungarian and Chinese, 6@6⅛c. per pound.

*Nickel.*—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per pound.

Imports of nickel into Germany for the half-year ending June 30 were 650 metric tons in 1903, and 767 tons in 1904; an increase of 117 tons this year.

*Platinum.*—Quotations are nominally $18.50 per ounce, but the tendency is upward, and higher prices are expected.

Platinum in manufactured forms is very firm. Messrs. Eimer & Amend, of New York, quote for different forms as follows: Heavy sheet and rod, 75c. per gram; foil and wire, 77c.; crucibles and dishes, 80c.; perforated ware, like cones, etc., 85c. per gram.

*Quicksilver.*—Prices are unchanged. In New York large lots have been offered at $43.50 per flask, with $44.50 quoted for smaller orders. The San Francisco price continues $43@$44 for domestic business; but as low as $41.50@$42 has been offered for export. The London price is £7 17s. 6d., with the same quotation from second hands.

Imports of quicksilver into Germany for the half-year ending June 30 were 359 metric tons in 1903, and 343 tons in 1904; a decrease of 16 tons this year.

*Minor Metals and Alloys.*—Thallium is quoted at 60@65 marks per kg. at Breslau, Germany. Manganese metal is quoted 360 marks per 100 kg., f. o. b. Bremen, Germany. Manganese tin alloy, 55%, is quoted 365 marks per 100 kg. for first quality and 225 marks for second quality, both f. o. b. Bremen.

For other minor metals and their alloys, wholesale prices, f. o. b. works, are as follows:

| Aluminum. | Per lb. | | Per lb. |
|---|---|---|---|
| No. 1.99% ingots | .33@37c. | Ferro-chrom. (74%) | .12½c. |
| No. 2.90% ingots | .31@34c. | Ferro-Tungsten (37%) | .45c |
| Rolled Sheets | .4c. up | Magn'um, pure (N.Y.) | .60c. |
| Alum-bronze | .20@23c. | Manganese | $2.75 |
| Nickel-alum | .33@39c. | Mangan'e Cp. (20% Mn) | 32c. |
| Bismuth | $2.10 | M'ng'n'e Cp. (30% Mn) | .38c. |
| Chr'm'm, pure (N. Y.) | .80c. | Molybdenum (Best) | $1.70 |
| Copper, red oxide | .50c. | Phosphorus, foreign | .45c. |
| Fe.-Molybd'm (50%) | $1.00 | Phosphorus, American | .70c. |
| Ferro-Titanium (10%) | .90c. | Sodium metal | .50c. |
| Ferro-Titanium (20@25%) | | Tungsten (Best) | $1.25 |
| N. Y. | .55c. | | |

Differences in price depend chiefly upon size and conditions of order.

### Missouri Ore Market. Aug. 13.

*(From Our Special Correspondent.)*

The highest price reported paid for zinc ore on a straight bid was $40 per ton, the same as several preceding weeks, but ore sold on an assay basis was settled for as high as $40.70 per ton. A sharper competition for the medium and better grades of zinc caused the price to advance in the face of an adverse spelter market 50c. and $1 per ton. Such advances have been reported from nearly every camp in the district. It appears to be quality more than quantity sought after, as the shipment was 470 tons of zinc less than the previous week. Lead sales were lighter, and the price is showing a weaker tendency, with the highest still resting at $52 per ton. A year ago zinc sold at $40 per ton on a spelter market of $5.50 St. Louis, against $4.75 this year.

Following are the sales of zinc and lead ores from the various camps of the Joplin district for the week:

| | Zinc, lb. | Lead, lb. | Value. |
|---|---|---|---|
| Joplin | 2,412,000 | 365,940 | $55,140 |
| Webb City-Carterville | 1,939,590 | 387,660 | 44,020 |
| Duenweg | 947,570 | 299,260 | 23,780 |
| Galena-Empire | 747,350 | 83,450 | 14,400 |
| Alba-Neck | 597,450 | ..... | 10,455 |
| Aurora | 765,430 | 25,880 | 9,545 |
| Sherwood-Mitchell | 226,800 | 17,620 | 4,880 |
| Prosperity | 161,890 | 71,400 | 4,850 |
| Carthage | 185,860 | ..... | 3,345 |
| Zincite | 237,500 | 4,290 | 4,620 |
| Oronogo | 113,440 | 36,490 | 2,485 |
| Spurgeon-Spring City | 155,250 | 7,650 | 2,430 |
| Granby | 109,440 | ..... | 1,970 |
| Reeds | 87,880 | ..... | 1,580 |
| Beef Branch | 49,810 | 24,880 | 1,000 |
| District the week | 8,737,260 | 1,324,520 | $184,500 |
| District total 34 weeks | 325,652,940 | 41,216,680 | $6,519,195 |

Zinc value the week, $152,330; 34 weeks, $5,389,995
Lead value, the week, $32,170; 34 weeks, $1,129,120.

### Average Prices of Metals per lb., New York.

| Mo. | Tin. | | Lead. | | Spelter. | |
|---|---|---|---|---|---|---|
| | 1903. | 1904. | 1903. | 1904. | 1903. | 1904. |
| Jan. | 28.33 | 28.845 | 4.075 | 4.347 | 4.865 | 4.863 |
| Feb. | 29.43 | 28.087 | 4.075 | 4.375 | 5.043 | 4.916 |
| Mar. | 30.15 | 28.317 | 4.442 | 4.475 | 5.349 | 5.057 |
| April. | 29.81 | 28.132 | 4.567 | 4.475 | 5.550 | 5.219 |
| May. | 29.51 | 27.718 | 4.325 | 4.423 | 5.639 | 5.031 |
| June. | 28.34 | 26.325 | 4.210 | 4.196 | 5.697 | 4.760 |
| July. | 27.68 | 26.573 | 4.075 | 4.192 | 5.662 | 4.873 |
| Aug. | 28.29 | ..... | 4.075 | ..... | 5.725 | ..... |
| Sept. | 26.77 | ..... | 4.243 | ..... | 5.686 | ..... |
| Oct. | 25.92 | ..... | 4.375 | ..... | 5.510 | ..... |
| Nov. | 25.42 | ..... | 4.218 | ..... | 5.038 | ..... |
| Dec. | 27.41 | ..... | 4.162 | ..... | 4.731 | ..... |
| Year | 28.09 | ..... | 4.237 | ..... | 5.400 | ..... |

NOTE.—The average price of spelter in St. Louis for the month of January, 1904, was 4.673c. per lb.; February, 4.717c.; March, 4.841c.; April, 5.038c.; May, 4.853c.; June 4.596c.; July, 4.723c.

### Average Prices of Copper.

| Mo. | New York. | | | | London. | |
|---|---|---|---|---|---|---|
| | Electrolytic. | | Lake. | | Standard. | |
| | 1903. | 1904. | 1903. | 1904. | 1903. | 1904. |
| Jan. | 12.159 | 12.410 | 12.361 | 12.553 | 53.52 | 57.55 |
| Feb. | 12.778 | 12.063 | 12.901 | 12.245 | 57.34 | 56.57 |
| Mar. | 14.416 | 12.299 | 14.572 | 12.551 | 63.85 | 57.321 |
| April. | 14.454 | 12.923 | 14.642 | 13.120 | 61.72 | 58.247 |
| May. | 14.435 | 12.758 | 14.618 | 13.000 | 61.73 | 57.321 |
| June. | 13.942 | 12.269 | 14.212 | 12.399 | 57.30 | 56.398 |
| July. | 13.094 | 12.380 | 13.341 | 12.505 | 56.64 | 57.256 |
| Aug. | 12.962 | ..... | 13.159 | ..... | 58.44 | ..... |
| Sept. | 13.205 | ..... | 13.345 | ..... | 56.82 | ..... |
| Oct. | 12.801 | ..... | 12.954 | ..... | 55.60 | ..... |
| Nov. | 12.617 | ..... | 12.813 | ..... | 56.30 | ..... |
| Dec. | 11.952 | ..... | 12.084 | ..... | 56.36 | ..... |
| Year | 13.235 | ..... | 13.417 | ..... | 57.97 | ..... |

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

### Average Prices of Silver, per ounce Troy.

| Mo. | 1902. | | 1903. | | 1904. | |
|---|---|---|---|---|---|---|
| | London, Pence. | N. Y., Cents. | London, Pence. | N. Y., Cents | London, Pence. | N. Y., Cents. |
| Jan. | 25.62 | 55.56 | 21.98 | 47.57 | 26.423 | 57.055 |
| Feb. | 25.41 | 55.09 | 22.11 | 47.89 | 26.665 | 57.592 |
| Mar. | 25.00 | 54.23 | 22.49 | 48.72 | 26.164 | 56.741 |
| April. | 24.34 | 52.72 | 23.38 | 50.56 | 24.974 | 54.202 |
| May. | 23.71 | 51.31 | 24.89 | 54.11 | 25.578 | 55.430 |
| June. | 24.17 | 52.36 | 24.29 | 52.86 | 25.644 | 55.673 |
| July. | 24.38 | 52.88 | 24.86 | 53.92 | 26.760 | 58.095 |
| Aug. | 24.23 | 52.52 | 25.63 | 55.36 | ..... | ..... |
| Sept. | 23.88 | 51.52 | 26.75 | 58.00 | ..... | ..... |
| Oct. | 23.40 | 50.57 | 27.89 | 60.36 | ..... | ..... |
| Nov. | 22.70 | 49.07 | 27.01 | 58.11 | ..... | ..... |
| Dec. | 22.21 | 48.03 | 25.73 | 55.375 | ..... | ..... |
| Year | 24.09 | 52.16 | 24.75 | 53.57 | ..... | ..... |

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

### DIVIDENDS.

| Company. | Latest Dividend—Payable. | Rate. | Total. | Total to date. |
|---|---|---|---|---|
| †Amalgam'td Copper | Aug. 29 | .50 | $769,430 | $25,042,697 |
| Cambria Steel | Aug. 15 | .75 | 675,000 | 7,800,000 |
| Daly-West | Aug. 15 | .40 | 72,000 | 4,237,000 |
| *Jeff. & C., C.&I., pf. | Aug. 15 | 2.50 | 37,500 | 675,500 |
| Jeff. & Clearf., com. | Aug. 15 | 5.00 | 75,000 | 255,000 |
| †National Carbon, pf | Aug. 15 | 1.75 | 78,750 | 1,811,250 |
| Parrot, Mont | Aug. 15 | .50 | 114,925 | 5,877,960 |
| Quincy, Mich | Aug. 25 | 2.50 | 250,000 | 14,620,000 |
| Standard Oil | Aug. 15 | 5.00 | 4,850,000 | 236,110,000 |
| †U. S. Steel Cor., pf. | Aug. 30 | 1.75 | 6,304,919 | 111,792,816 |

*Monthly. †Quarterly.

### ASSESSMENTS.

| Company. | Delinquent. | Sale. | Amount. |
|---|---|---|---|
| Albion, Utah | Aug. 6 | Aug. 23 | $0.05 |
| Allouez, Mich | Sept. 26 | ..... | 1.50 |
| Best & Belcher, Nev | Aug. 19 | Sept. 8 | .10 |
| Caledonia, Nev | Aug. 31 | Sept. 21 | .15 |
| Con. Imperial, Nev | Aug. 10 | Sept. 6 | .01 |
| Con. Naw York, Nev | Sept. 15 | ..... | .05 |
| Gould & Curry, Nev | Aug. 12 | Aug. 30 | .10 |
| Julia Con., Nev | Aug. 11 | Sept. 1 | .03 |
| New York, Bonanza, Utah | Aug. 2 | Aug. 25 | .02 |
| Middle Yuba, Cal | Aug. 23 | ..... | .01 |
| Overman, Nev | Aug. 23 | Sep. 12 | .10 |
| Seg. Belcher & Mides, Nev. | Aug. 30 | Sept. 19 | .05 |
| Silver Shield, Utah | Aug. 24 | Sept. 12 | .03 |
| St. George Copper, Utah | Aug. 15 | Aug. 30 | .01 |
| Red Cross, Utah | Aug. 11 | Aug. 26 | .09 |
| Union Con., Nev | Aug. 23 | Sept. 12 | .10 |

# STOCK QUOTATIONS

## NEW YORK.

| Company. | Par val. | Aug. 10 H. | Aug. 10 L. | Aug. 11 H. | Aug. 11 L. | Aug. 12 H. | Aug. 12 L. | Aug. 13 H. | Aug. 13 L. | Aug. 15 H. | Aug. 15 L. | Aug. 16 H. | Aug. 16 L. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Alpha, g. s. | $1 | 10 | | | | | | | | | | | | 100 |
| Amalgamated | 100 | 53½ | 52½ | 53½ | 52⅝ | 54½ | 52⅝ | 54 | 53½ | 54⅛ | 54 | 54½ | 53½ | 159,310 |
| Anaconda | 25 | 73½ | 72 | | | 73 | | 73½ | | 73½ | | 73 | | 1,200 |
| Best & Belcher | 3 | 64 | | | | | | | | | | 19 | | 300 |
| Brunswick | 1 | 18 | | 17 | | | | | | 19 | | 20 | | 2,500 |
| Bullion | 1 | 25 | | | | | | | | | | | | 200 |
| Caledonia | 1 | | | | | | | 46 | 45 | 50 | | | | 600 |
| Chollar | 2½ | | | | | | | | | | | | | |
| Chrysolite | 50 | | | | | | | | | | | | | |
| Confidence | 1 | | | | | | | | | 70 | | | | 100 |
| Con.Cal & Va | 3 | 120 | | | | 120 | | 125 | | 115 | | 110 | | 650 |
| Con. Imperial | 2½ | | | 2 | | | | | | | | | | 500 |
| Creede & C. Ck. | 1 | | | 2 | | | | | | | | | | 500 |
| Cripple CreekCon | 1 | 8 | | | | 8 | | | | | | 8 | | 1,500 |
| Crown Point | 1 | | | | | 12 | | | | 15 | | | | 800 |
| Elkton | 1 | | | 65 | 64 | | | | | | | | | 500 |
| Gold Dollar | 1 | | | 5 | | | | 5 | | | | | | 1,300 |
| Greene Con. | 10 | 14½ | 14½ | 14½ | 14⅜ | 14½ | 14⅜ | 14⅜ | | 14½ | 14½ | 14½ | | 5,550 |
| Hale & Norcross | 3 | | | | | | | | | 70 | | | | 300 |
| Homestake | 100 | | | | | | | | | | | | | |
| Isabella | 1 | | | 20 | | | | | | | | 22 | | 1,300 |
| Justice | 2 | | | | | | | | | | | | | |
| Little Chief | 50 | 5 | | | | | | | | 5 | | | | 600 |
| Mexican | 3 | 8 | | | | | | | | 84 | | | | 400 |
| Mollie Gibson | 5 | | | | | | | | | | | | | |
| Moon Anchor | 3 | | | | | 7 | | | | | | | | 1,000 |
| Occidental | 3 | | | | | | | | | | | | | |
| Ophir | 5 | | | 235 | | 235 | | 235 | | | | | | 400 |
| Overman | 2 | | | | | | | | | | | | | |
| Pharmacist | 1 | | | | | | | | | 3½ | | | 12 | 1,000 |
| Phoenix | 1 | | | | | 12 | | 12 | 11 | | | 13 | | 3,300 |
| Portland | 1 | 170 | | | | 165 | | | | | | | | 200 |
| Potosi | 1 | | | 13 | | | | | | | | | | 200 |
| Rose Maud | 1 | | | | | 6 | | | | | | | | 1,000 |
| Savage | 3 | | | 23 | | 22 | | | | | | 28 | 25 | 700 |
| Sierra Nevada | 3 | | | | | | | | | 23 | | 26 | | 500 |
| Silver Hill | | | | | | | | | | | | | | |
| Standard Con. | 10 | 200 | | | | | | | | | | | | 200 |
| Tennessee | 25 | 28 | | | | 28½ | | | | | | | | 250 |
| Union Con | | | | | | | | | | | | | | |
| Union Copper | 10 | | | | | | | | ¼ | | | | | 400 |
| United Cp. Com. | 100 | | | | | | | | | ¼ | | | | |
| Vindicator | 1 | | | | | | | | | | | | | |
| White Knob | 10 | 3¾ | 2½ | 4 | | 4 | | | 9 | | 9 | | 27 | 2,000 |
| Work | 1 | | | | | | | | | | | | | 1,500 |
| Yellow Jacket | 3 | | | | | | | | | | | | | 100 |

Total sales, 190,960 shares.

## COAL, IRON AND INDUSTRIAL STOCKS.

| Company | Par val. | Aug. 10 H. | Aug. 10 L. | Aug. 11 H. | Aug. 11 L. | Aug. 12 H. | Aug. 12 L. | Aug. 13 H. | Aug. 13 L. | Aug. 15 H. | Aug. 15 L. | Aug. 16 H. | Aug. 16 L. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Allis-Chalmers | $100 | 11½ | 11 | | | | | | | | | | | 200 |
| Preferred | 100 | | | 50 | | | | | | 47 | | | | 150 |
| Am. Agr. Chem. | 100 | | | | | | | | | | | | | |
| Preferred | 100 | | | | | | | | | | | | | |
| †Am. Sm. & Ref. | 100 | 59⅛ | 58¼ | 59½ | 58⅛ | 60⅛ | 59 | 60⅛ | 60¼ | 60⅛ | 60⅛ | 60½ | 59½ | 63,760 |
| Preferred | 100 | | | 101½ | 101⅛ | 105 | 101⅛ | 104⅛ | 104 | 104⅛ | 104 | 104 | | 8,975 |
| Col. Fuel & I | 100 | 36½ | 35½ | 36½ | 35¼ | 37½ | 36 | 37½ | 37 | 37½ | 37 | 36½ | | 6,970 |
| Col. & H. C. & I. | 100 | 9⅛ | 9¼ | 9⅛ | | 9½ | | 9⅛ | | 9⅛ | 9⅛ | 9⅛ | | 1,195 |
| Crucible Steel | 100 | 5⅝ | | 5⅝ | 5¼ | | | 5½ | | 5½ | | | | 520 |
| Preferred | 100 | 37½ | 37¼ | 37 | 35¼ | | | 36 | | 37 | | 37 | | 1,305 |
| General Chemical | 100 | | | | | | | | | | | | | |
| Preferred | 100 | | | | | | | | | | | | | |
| Mong. R. Coal | 50 | | | | | | | | | 8 | | | | 275 |
| Preferred | 50 | 19⅛ | 19½ | | | 20 | | | | 20 | 19⅛ | | | 327 |
| National Lead | 100 | 21¼ | 21⅛ | 21½ | 21⅛ | 23¼ | 22 | 23⅛ | 23 | 23⅛ | 22¼ | 22⅛ | 22⅛ | 17,395 |
| Preferred | 100 | 92½ | | | | 94 | | 94⅛ | | 94⅛ | 94⅛ | | | 710 |
| Phila. Nat. Gas | 100 | 38½ | 38 | 38⅛ | | | | | | | | | | 70 |
| Preferred | 100 | | | | | 44 | | | | | | | | 100 |
| Pittsburg Coal | 100 | 13½ | | 13 | | | | | | | | | | 110 |
| Preferred | 100 | 55 | | 55 | | 56½ | 55 | 55 | | 56 | | 57½ | 57 | 1,410 |
| Republic I. & S. | 100 | 7⅛ | | 7⅛ | | 7½ | | 7⅛ | 7⅛ | 7⅛ | 7⅛ | | | 2,165 |
| Preferred | 100 | 43½ | | 43½ | | 43 | 42⅛ | 43⅛ | | | | 44 | 43 | 1,735 |
| Schloss-Shef.S & I | 100 | | | | | 37½ | 37 | | | 38 | 37½ | 37 | | 700 |
| Preferred | 100 | | | | | | | 88 | | | | 88 | | 70 |
| †Standard Oil | 100 | 631 | 630 | 630 | 629 | 630 | | 630 | | 630 | 628 | | | 175 |
| Tenn.C.I.&R.R. | 100 | 44 | 43 | 44 | 42½ | 44⅛ | 43½ | 44⅛ | 44⅛ | 45⅛ | 45 | 45 | 44 | 13,800 |
| U.S.Steel Corp | 100 | 11⅞ | 11⅛ | 12⅛ | 11⅛ | 12 | 11½ | 12⅛ | 11⅛ | 12⅛ | 12⅛ | 12⅛ | 11⅞ | 49,670 |
| Preferred | 100 | 58⅞ | 58⅛ | 59½ | 57½ | 59½ | 58⅛ | 60½ | 59 | 60⅛ | 59⅛ | 59⅞ | 58½ | 192,382 |
| Va.-Car Chem | 100 | 29⅞ | 29½ | 29½ | 29 | 29½ | 28½ | | | 30⅛ | 29½ | 30½ | 29½ | 10,665 |
| Preferred | 100 | 104½ | 103½ | 104½ | 104½ | 104½ | 104½ | 104½ | 104½ | 104½ | 104 | 104½ | 104½ | 3,185 |

*Pittsburg Exchanges; all others, New York Stock Exchange †Ex Dividend,
Total Sales, 378,019 shares.

## SAN FRANCISCO.*

| Company. | Location. | Aug. 4 H. | Aug. 4 L. | Aug. 5 H. | Aug. 5 L. | Aug. 6 H. | Aug. 6 L. | Aug. 8 H. | Aug. 8 L. | Aug. 9 H. | Aug. 9 L. | Aug. 10 H. | Aug. 10 L. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Golden Anchor | Nev. | | | | | | | | | | | | | |
| MacNamara | Nev. | 44 | 33 | 42 | 37 | 41 | | 40 | 36 | 38 | 35 | 40 | 36 | 44,058 |
| Mont. Tonopah | Nev. | 245 | 242½ | 242½ | | 242½ | | 242½ | | 240 | | 250 | 240 | 3,600 |
| Ton. Belmont | Nev. | 70 | | 70 | | | | | | | | 70 | 68 | 2,600 |
| Ton. Midway | Cal. | 52 | 50 | 50 | 49 | 49 | 48 | 48 | | 47 | | | | 6,618 |
| Ton. Mg. Co. | Nev. | | | 825 | 812½ | 887½ | | | | 800 | | 800 | | 450 |
| Ton. North Star | Nev. | | | | | | | | | | | | | |

* San Francisco & Tonopah Exchange. Total Sales, 57,326 shares.

## SAN FRANCISCO (By Telegraph.)

| Company | August 15 | August 16 | Company | August 15 | August 16 |
|---|---|---|---|---|---|
| Belcher | $0.27 | $0.22 | Gould & Curry | $0.24 | $0.22 |
| Best & Belcher | .80 | .86 | Hale & Norcross | .69 | .68 |
| Caledonia | .52 | .48 | Mexican | .90 | .80 |
| Challenge Con. | .28 | .22 | Ophir | 2.55 | 2.55 |
| Chollar | .18 | .16 | Overman | .13 | .12 |
| Confidence | .75 | .75 | Sierra Nevada | .25 | .23 |
| Con. California & Virginia | 1.15 | 1.15 | Union Con. | .27 | .25 |
| Crown Point | .18 | .17 | Yellow Jacket | .24 | .22 |

## BOSTON, MASS.

| Company. | Par val. | Aug. 10 H. | Aug. 10 L. | Aug. 11 H. | Aug. 11 L. | Aug. 12 H. | Aug. 12 L. | Aug. 13 H. | Aug. 13 L. | Aug. 15 H. | Aug. 15 L. | *Aug. 16 H. | *Aug. 16 L. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Adventure Con. | $25 | | | 100 | 75 | 87½ | 80 | | | 1.00 | | | | 985 |
| Allouez | 25 | 10 | 8⅛ | 10 | 9¼ | 10⅛ | 10 | 10⅛ | 10¼ | 10⅛ | 10⅛ | | | 8,458 |
| †Amalgamated | 100 | 53⅛ | 52⅛ | 53⅛ | 52⅛ | 54 | 52⅛ | 54 | 53⅛ | 54⅛ | 53⅛ | | | 17,025 |
| American Zinc | 25 | 12 | 11⅛ | | | | | | | 12 | 11⅛ | | | 220 |
| Anaconda | 25 | | | | | | | | | | | | | |
| Arcadian | 25 | | | | | 75 | | 85 | 77½ | 1.00 | | | | 320 |
| Arnold | 25 | | | | | | | | | | | | | |
| Atlantic | 25 | 9⅛ | 9 | 9 | | 9⅛ | 9 | 9⅛ | | 11 | 9⅛ | | | 2,175 |
| Bingham Con. | 50 | 25⅛ | 24⅛ | 25 | 24⅛ | 25⅛ | 24⅛ | 25⅛ | 25 | 25 | | | | 1,420 |
| Bonanza | 10 | | | | | | | | | 45 | | | | 150 |
| Boston Con. | 5 | 6⅛ | | 6⅛ | 6⅛ | 6⅛ | 6⅛ | 6⅛ | | 6⅛ | 6⅛ | | | 2,045 |
| Calumet & Hecla | 25 | 480 | | | | 480 | | 500 | 480 | 500 | | | | 126 |
| Centennial | 25 | 24⅛ | 24⅛ | 24⅛ | | 24⅛ | 24⅛ | 24⅛ | | 24⅛ | | | | 771 |
| Central Oil | | | | | | | | | | | | | | |
| Con. Mercur | 5 | 35 | | 35 | | 36 | | 35 | | 36 | | | | 800 |
| Cont. Zinc Mg. | 25 | | | | | | | | | | | | | |
| Copper Range | 100 | 55⅛ | 54⅛ | 55⅛ | 54⅛ | 55⅛ | 53⅛ | 55⅛ | 55 | 55 | 54 | | | 6,760 |
| Daly-West | 20 | 13⅛ | 12⅛ | 13⅛ | 12⅛ | 13 | 12⅛ | 13 | 12⅛ | 13 | 12 | | | 2,213 |
| Dominion Coal | 100 | | | | | 50 | 48 | | | 51 | 50 | | | 545 |
| Preferred | | | | | | | | | | | | | | |
| Dominion I.& S | 100 | 8⅛ | 8⅛ | | | 8⅛ | 8⅛ | | | | | | | 70 |
| Elm River | 12 | | | 2 | | | | 2⅛ | 2 | 2⅛ | 2 | | | 300 |
| Franklin | 25 | | | | | | | | | 7⅛ | | | | 50 |
| Grapby Con. | 10 | 3 | | | | | | | | | | | | 50 |
| Guanajuato Con. | 5 | | | 1⅛ | 1⅛ | 1⅛ | | | | 1⅛ | | | | 600 |
| Isle Royal Con | 25 | 13⅛ | 12⅛ | 14 | 12⅛ | 14 | 13⅛ | 14 | 13⅛ | 14⅛ | 14 | | | 2,915 |
| Mass Con | 25 | | | 3⅛ | 3⅛ | | | | | | | | | 110 |
| Mayflower | 25 | | | | | | | | | | | | | |
| Michigan | 25 | 4 | | 4⅛ | | | | | | 4⅛ | | | | 185 |
| Mohawk | 25 | 42⅛ | | 42⅛ | 42⅛ | 42⅛ | 42⅛ | 42⅛ | | 42⅛ | 42⅛ | | | 655 |
| Mont. Coal & C. | 25 | | | | | | | | | 3⅛ | | | | 50 |
| New Idria,q'sil. | 5 | | | | | | | | | 10 | | | | 150 |
| Old Colony | 25 | | | | | | | | | | | | | |
| Old Dominion | 25 | | | 13 | | 13 | 12⅛ | 12⅛ | | | | | | 405 |
| Osceola | 25 | 63⅛ | 63 | | | 64⅛ | 63½ | | | 64⅛ | 64⅛ | | | 710 |
| Parrot | 10 | 23⅛ | | 23⅛ | | 25⅛ | 24 | 25 | | | | | | 1,130 |
| Phœnix Con. | 25 | 62½ | 50 | 75 | 50 | 75 | 50 | 75 | | | | | | 975 |
| Quincy | 25 | 83 | 81 | | | 84 | | | | 84 | | | | 103 |
| Rhode Island | 25 | | | | | | | | | | | | | |
| Santa Fe | 10 | | | | | 1⅛ | | 1⅛ | | | | | | 120 |
| Shannon | 10 | 5 | 4⅛ | 4⅛ | 3⅛ | 4 | 3⅛ | 4⅛ | 3⅛ | 4⅛ | 4 | | | 26,757 |
| Tamarack | 25 | | | 95 | 90 | 96 | 95⅛ | | | | | | | 351 |
| Trinity | 25 | 8⅛ | 7⅛ | 8⅛ | 7⅛ | 8⅛ | 7⅛ | 8 | 7⅛ | 8 | 7⅛ | | | 4,022 |
| United States | 10 | 22⅛ | 22 | 22 | | 22⅛ | 22 | 22⅛ | | 22⅛ | 21⅛ | | | 1,375 |
| U.S.Coal & Oil | 25 | 10⅛ | | 10⅛ | 10⅛ | 10⅛ | 10⅛ | | | 10⅛ | | | | 585 |
| Utah Con.,g.c. | 5 | 39 | 38⅛ | 38⅛ | 38⅛ | 39⅛ | 38⅛ | 39⅛ | 39⅛ | 39⅛ | 39⅛ | | | 12,171 |
| Victoria | 25 | | | 2⅛ | | 2⅛ | | 2⅛ | | 3 | 2⅛ | | | 360 |
| Winona | 25 | 8⅛ | 7⅛ | | | 8⅛ | 8 | 8⅛ | 8⅛ | 8⅛ | | | | 1,282 |
| Wolverine | 25 | 80 | | | | 80 | 79 | 80 | 79⅛ | 79⅛ | 79 | | | 165 |
| Wyandot | 25 | | | 70 | 62⅛ | | | | | | | | | 60 |

*Holiday. Total sales, 99,719 shares.

## COLORADO SPRINGS, COLO.

| Company. | Par val. | Aug. 6 H. | Aug. 6 L. | Aug. 8 H. | Aug. 8 L. | Aug. 9 H. | Aug. 9 L. | Aug. 10 H. | Aug. 10 L. | Aug. 11 H. | Aug. 11 L. | Aug. 12 H | Aug. 12 I. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Acacia | $1 | 7 | 6 | 7 | 6 | 6½ | 6 | 7 | 6 | 6½ | 6 | 6½ | 6 | 1,500 |
| Anaconda | 5 | 12 | 11 | 12 | 11½ | 12 | 11½ | 12 | 11½ | 12 | 11½ | 12 | 11½ | 500 |
| Colo. City & M. | 1 | 2 | 1½ | 2 | 1½ | 2 | 1½ | 2 | 1½ | 2 | 1½ | 1½ | 1½ | 1,000 |
| C. K. & N. | 1 | 35½ | 34½ | 36 | 34 | 36 | 32½ | 36 | 34½ | 36 | 34½ | 33 | | 7,000 |
| Cripple Ck. Con | 1 | 8½ | 8½ | 8½ | 8½ | 8½ | 8½ | 8½ | 8½ | 8½ | 8½ | 8½ | 8½ | 13,500 |
| Des Moines | 1 | 2 | 1½ | 2 | 1½ | 2 | 1 | 2 | 1 | 2 | 1 | 2 | 1½ | |
| Doctor-Jack Pot | 1 | 4½ | 4½ | 4½ | 4 | 4½ | 4 | 4½ | 4 | 4½ | 4½ | 4½ | 4½ | 1,000 |
| Elkton Con | 1 | 64½ | 64 | 65 | 64½ | 65½ | 64½ | 64½ | 64½ | 64½ | 64 | 64½ | 64½ | 2,800 |
| El Paso | 1 | 89½ | 89½ | 91 | 90½ | 90½ | 90 | 90 | | 90½ | 90 | 91 | 90½ | 7,122 |
| Gold Dollar Con. | 1 | 6 | 5½ | 6½ | 5½ | 5½ | 5½ | 5½ | 5½ | 5½ | 5½ | 5½ | 5½ | 21,000 |
| Gold Sovereign | 1 | 6½ | 6 | 6½ | 6 | 6½ | 6 | 6½ | 6 | 6½ | 6 | 6½ | 6 | 6,000 |
| Golden Cycle | 1 | 45 | 40 | 45 | 40 | 45 | 40 | 45 | 40 | 45 | 40 | 45 | 40 | |
| Hart | 1 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | |
| Isabella | 1 | 21½ | 20½ | 22 | 20 | 21½ | 20 | 20 | | 22 | 20 | 21½ | 20 | |
| Jack Pot | 1 | 5 | 2 | 5 | | 5 | | 5 | | 5 | 3 | 5 | | |
| Keystone | 1 | 4½ | | 5 | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 5 | 4½ | 15,000 |
| Last Dollar | 1 | 40 | | 40 | | 40 | | 40 | | 40 | | 40 | | |
| Lexington | 1 | 4 | 3½ | 4 | 3½ | 4 | 3½ | 4 | 3½ | 4 | 3½ | 3½ | 3½ | 1,000 |
| Little Puck | 1 | 3½ | | 3½ | 3½ | 3½ | 3½ | 3½ | 3½ | 3½ | 3½ | 3½ | 3½ | |
| Mollie Gibson | 1 | 4½ | 4½ | 4½ | 4 | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 4½ | 2,000 |
| Moon-Anchor | 5 | 6½ | 6½ | 6½ | 6 | 7 | 6½ | | | 7½ | 6½ | 6½ | | 7,000 |
| New Haven | 5 | 3 | | 3½ | 2½ | 3 | 2½ | 3½ | 3 | 3½ | 3½ | 3½ | 3½ | 5,000 |
| Old Gold | 1 | 9½ | 8½ | 9½ | 9 | 9½ | 9 | 9½ | 9 | 9½ | 9 | 9½ | 9 | 3,000 |
| Pharmacist | 1 | 3½ | 3½ | 3½ | 3½ | 3½ | 3½ | 4 | 3½ | 4 | 3½ | 4 | 3½ | 2,000 |
| Portland | 1 | 170 | 162 | 167 | 165 | 170 | 165 | 170 | 165 | 170 | 160 | 170 | 160 | 2,300 |
| Vindicator Con. | 1 | 70 | 66 | 70 | 66 | 70 | 65½ | 70 | 65½ | 65 | | 75 | 65 | |
| Work | 1 | 9½ | 9½ | 9½ | 9½ | 9½ | 9½ | 9½ | 9½ | 9½ | 9½ | 9½ | 8½ | 23,000 |

Total sales, 121,722 shares.

## COLORADO SPRINGS (By Telegraph).

| Company. | Aug. 15. H. | Aug. 15. L. | Aug 16. H. | Aug. 16. L. | Company. | Aug. 15. H. | Aug. 15. L. | Aug. 16. H. | Aug. 16. L. |
|---|---|---|---|---|---|---|---|---|---|
| Anaconda | 12 | 11½ | | | Jack Pot | 5 | 3 | | |
| Cripple Ck. Con | 8½ | 8½ | | | Last Dollar | 41 | 40 | | |
| C. K. & N | 40 | 33 | 36 | 32½ | Mollie Gibson | 4½ | 4 | 4½ | 4½ |
| Doctor Jack Pot | 4½ | 4½ | | | Moon Anchor | 7½ | 6½ | 6½ | |
| Elkton Con | 64½ | 64½ | 64½ | 63½ | Old Gold | 10½ | 9½ | 11½ | 10½ |
| El Paso | 90½ | 90½ | 90½ | 90 | Pharmacist | 3½ | 3½ | 3½ | 3½ |
| Gold Dollar | 55½ | 55½ | 5½ | 5½ | Portland | 1.70 | 1.60 | | |
| Gold Sovereign | 6 | 5½ | | | Vindicator Con. | 75 | 65 | 70 | 65 |
| Isabella | 20½ | 20 | 21½ | 20 | Work | 9 | 8½ | | |

## PHILADELPHIA, PA.

| Company. | Par val. | Aug. 10 H. | Aug. 10 L. | Aug. 11 H. | Aug. 11 L. | Aug. 12 H. | Aug. 12 L. | Aug. 13 H. | Aug. 13 L. | Aug. 15 H. | Aug. 15 L. | Aug. 16 H. | Aug. 16 L. | Sales. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cambria Iron | $50 | | | | | | | 47½ | | | | 47½ | | 189 |
| Cambria Steel | 50 | | | 19½ | | 19½ | | 19½ | | 20 | 19½ | 20 | | 543 |
| Int.Smokel'sPwd | 100 | | | | | | | | | | | | | |
| Preferred | 100 | | | | | | | | | | | | | |
| Lehigh C. & N. | 50 | | | 78½ | | | | | | | | 79½ | | 10 |
| Mont. Tonopah | 1 | 245 | | 245 | | 245 | | | | 2.45 | | | | |
| Philadelphia | 50 | 39 | 38⅜ | 39 | 38⅜ | 39⅛ | 39 | 39⅛ | | 39⅛ | 39½ | | | 1,502 |
| Preferred | 50 | 45½ | | 44½ | | 44½ | 44½ | 44½ | | 44½ | | | | 404 |
| Tonopah | 100 | | | | | 8.00 | | | | | | | | |
| Tonopah-Belm. | 1 | | | | | | | | | | | | | |
| United Gas | 50 | 86½ | | 87⅛ | 86½ | 87⅛ | 87⅛ | 87⅛ | 87⅛ | 87½ | | 87⅛ | 87⅛ | 3,243 |
| Westmoreland C | 50 | | | | | | | | | | | | | |

Total sales, 5,891 shares.

# STOCK QUOTATIONS

## ST. LOUIS, MO.* Aug. 13

| Company | Par Val | Bid | Ask | Company | Par Val | Bid | Ask. |
|---|---|---|---|---|---|---|---|
| Am.-Nettie, Colo | $10 | $0.15 | $0.25 | Columbia Lead, Mo | $10 | .75 | $2.00 |
| Catherine Lead, Mo. | 10 | 1.00 | 2.00 | Con. Coal, Ill. | 100 | 14.00 | 15.50 |
| Central Coal & C. | 100 | 62.00 | 63.00 | Doe Run Lead, Mo | 100 | 110.00 | 115.00 |
| Central C. & C., Pf. | 100 | 71.00 | 72.00 | Granite, Bimet Mt | 10 | .40 | .48 |
| Central Lead, Mo. | 100 | 110.00 | 115.00 | St. Joe Lead, Mo | 10 | 14.00 | 15.00 |

*By our Special Correspondent.

## SALT LAKE CITY.* Aug. 13

| Company | Par Val | High | Low | Sales | Company | Par Val | High | Low | Sales |
|---|---|---|---|---|---|---|---|---|---|
| Ajax | | 4 | 3 | 2,742 | N.Y.Bonanza | | 4⅛ | 3⅞ | 9,500 |
| Butler Liberal | $ 1 | 10¼ | 9 | 4,500 | Sacramento | $ ½ | 11⅛ | 10¼ | 4,600 |
| Carisa | 1 | 8⅛ | 8 | 8,600 | Silver Shield | 25 | 2½ | 2½ | 100 |
| Century | 1 | 35 | 35 | 1,850 | Star Con. | 1 | 13 | 12½ | 4,800 |
| Con. Mercur | | 36 | 29½ | 6,800 | Tetro | 5 | 32½ | 32 | 4,900 |
| Columbus Con. | 5 | 1.00 | 1.00 | 100 | Uncle Sam, Con | 1 | 24 | 22½ | 5.250 |
| Daly | 20 | 2.45 | 2.45 | 310 | Victoria. | 1 | 75 | 75 | 100 |
| Daly Judge | 10 | 4.25 | 4.22½ | 75 | Victor Con | 1 | 01 | 01 | 1,000 |
| Daly West | 20 | 14.25 | 12.85 | 1,417 | Yankee Con | 1 | 34 | 36½ | 2,100 |
| La Reine | | 6½ | 6½ | 600 | | | | | |
| May Day | 1 | ¼ | ¼ | 7,230 | | | | | |
| Mammoth | 1 | 1.48 | 1.47 | 700 | | | | | |

*By our Special Correspondent. Total sales 67,174 shares.

## DULUTH, MINN. Aug. 6

| Company | Par Val | Bid | Ask | Company | Par Val | Bid | Ask. |
|---|---|---|---|---|---|---|---|
| Calumet & Arizona | $10 | $100.00 | $105.00 | Lake Sup. & Pitts Dev. | $10 | $145.00 | $150.00 |
| Calumet & Bisbee | 10 | 3.00 | 4.50 | Pitts. & Duluth Dev. | 15 | 33.50 | 36.00 |
| Calumet & Cochise | 10 | 5.00 | 5.50 | Shakespeare. | 10 | ..... | .20 |
| Calumet & Pittsburg. | 10 | 25.00 | 28.00 | United Mexican | 10 | ..... | .50 |
| Higgins Development. | 10 | 2.00 | 2.50 | Wolverine & Arizona. | 10 | 3.50 | .... |
| Junction Development. | 15 | 18.00 | 21.00 | Yaqui. | 10 | ..... | 1.00 |

## MONTREAL.* Aug 12

| Company | Par Val | High | Low | Sales | Company | Par Val | High | Low | Sale- |
|---|---|---|---|---|---|---|---|---|---|
| Dominion Coal | 100 | 49.50 | 47.25 | 380 | Montreal Steel | 100 | 40.00 | 35.00 | ..... |
| Dom. Coal, Pf. | 100 | | | | Mont'l Steel, Pf | 100 | 100.00 | 75.00 | .... |
| Dom. I. & St. | 100 | 8.62½ | 8.50 | 285 | Nova Scotia St. | 100 | 59.50 | 54.87½ | 987 |
| Dom. I. & St., Pf | 100 | 28.00 | | 75 | N. S. Steel, Pf. | 100 | | | |
| Internat'l Coal | 100 | | | | Ogilvie | 100 | 200.00 | 180.00 | |
| Int'l Coal, Pf | 100 | | | | Ogilvie, Pf. | 100 | 125.50 | 100.00 | |

*Montreal Stock Exchange. Total sales, 1,727 shares.

## MEXICO.* Aug. 5

| Company | Shares Issued | Prices, Mex. Bid. | Ask. | Company | Shares Issued | Prices, Mex. Bid. | Ask. |
|---|---|---|---|---|---|---|---|
| DURANGO: | | | | San Rafael y An., aviada | 1,200 | $700 | $720 |
| Ca. Min de Penoles | 2,500 | $2,700 | $3,200 | Soledad, aviada | 670 | 900 | 910 |
| San Andres de la Sierra | 200 | 10,000 | ..... | Sorpresa, aviada | 960 | 300 | 315 |
| GUANAJUATO: | | | | MEXICO: | | | |
| Angustias, Pozos. | 2,400 | 35 | 38 | Alacran | 2,400 | 20 | 28 |
| Cinco Senores y An. aviadoras | 2,000 | 34 | 38 | Aldebarren | 2,000 | 52 | 58 |
| Cinco, Senores y An. aviada | 400 | 34 | 38 | Buen Despacho | 3,000 | 58 | 62 |
| Providencia, San Juan de la Luz | 6,000 | 50 | 55 | Dos Estrellas | 3,000 | 1,910 | 1,940 |
| Queensland y Australia | 300 | 8 | 12 | La Esperanza (El Oro.) | 3,000 | 1,500 | 1,500 |
| GUERRERO: | | | | La Reformia, aviadores | 2,000 | 30 | 36 |
| Delfina, 1st serie | 2,500 | 30 | 40 | Santa Ana, Esperanza | 2,400 | 60 | 80 |
| Delfina, 2nd serie | 2,500 | 25 | 30 | MICHOACAN: | | | |
| Garduno y Anexas | 7,200 | 35 | 40 | Luz de Borda, aviadora | 3,000 | 7 | 11 |
| HIDALGO: | | | | Luz de Borda, aviado | 1,000 | 10 | 16 |
| Amistad y Concordia | 9,600 | 76 | 80 | Santiago y An., Tlal. | 4,000 | 7 | 10 |
| Carmen, aviada | 1,100 | 90 | 95 | NUEVO LEON: | | | |
| Guadalupe Fresnillo Mill | 1,000 | 170 | 200 | La Fraternal | 1,000 | 580 | 620 |
| Guadalupe Fresnillo Mine | 1,400 | 70 | 80 | Norias de Bajan | 1,000 | 880 | 920 |
| La Reina y An., aviadora | 5,600 | 2½ | 5 | SAN LUIS POTOSI: | | | |
| Luz de Maravillas, aviadas | 1,100 | ... | 20 | Conecpcion y An | 3,000 | 60 | 65 |
| Maravillas y An., aviador | 1,680 | 110 | 150 | El Barreno, aviadora | 2,000 | 80 | 82 |
| Maravillas el Lobo | 1,000 | 130 | 180 | Sta. Maria de la Paz | 9,600 | 185 | 190 |
| Palma y An., aviador | 1,800 | 4 | 8 | San Diegoy Annexas | 2,400 | 8 | 15 |
| Refugio, aviada | 12,800 | 680 | 740 | ZACATECAS: | | | |
| Santa Anay An., aviadora | 800 | 50 | 70 | Asturiana y An. | 2,500 | 20 | 28 |
| Santa Anay An., aviada | 600 | 25 | 35 | Candelaria y Pinos. | 2,500 | 12 | 20 |
| Sta. Gertrudis y An aviadas | 9,600 | 13 | 15 | Esperanz y An | 2,400 | 6 | 8 |
| Sta. Gertrudis y An. aviadora | 28,800 | 75 | 77 | Lourdes | 2,500 | 21 | 25 |
| Santo Tomas Apostol aviadoras | 5,100 | 2 | 3 | Luz de Minillas, pagadoras | 2,000 | ..... | ..... |
| San Felipe de Jesus aviadora | 3,600 | 16 | 17 | Nueva Quebradilla, aviadoras | 2,400 | 16 | 25 |
| San Felipe de Jesus aviada | 1,200 | 4 | 5 | Nueva Quebradilla, aviadas | 600 | 20 | 30 |
| San Rafael y An., Trompillo | 1,200 | 1,830 | 1,870 | San Carlos y Annexas | 2,500 | 35 | 45 |
| | | | | Sta. Maria de Gaud. | 2,500 | 110 | 120 |
| | | | | MISCELLANEOUS | | | |
| | | | | Bartolome de Medina | 2,000 | 97 | 100 |
| | | | | Naica (Chihuahua) | 100 | 11,000 | 13,000 |
| | | | | Natividad (Oaxaca) aviadora | 1,800 | 950 | 1,000 |
| | | | | San Francisco Hac | 6,000 | 83 | 85 |
| | | | | Union Hacienda | 3,000 | 290 | 310 |

* Figures represent Mexican currency.

## LONDON. July 29

| Company. | Shares Issued. | Par value. | Latest dividend. Amt. | Date. | Quotations. Buyers. | Sellers. |
|---|---|---|---|---|---|---|
| American: | | £. s. d. | s. d. | | £. s. d. | £. s. d. |
| Alaska-Treadwell | 200,000 | 5 0 0 | 2 0 | July, 1904 | 4 10 0 | 4 15 0 |
| Anaconda | 1,200,000 | 5 0 0 | 2 0 | May, 1904 | 3 12 6 | 3 15 0 |
| Camp Bird | 820,000 | 1 0 0 | 9 | Aug., 1904 | 1 6 3 | 1 8 9 |
| Copiapo | 112,500 | 2 0 0 | 6 10 | May, 1903 | 12 6 | 1 2 6 |
| De Lamar | 80,000 | 1 0 0 | 1 6 | May, 1904 | 11 3 | 16 3 |
| El Oro | 1,080,000 | 1 0 0 | 9 | July, 1904 | 1 1 3 | 1 2 6 |
| Esperanza | 455,000 | 1 0 0 | 6 | Aug., 1904 | | |
| Frontino & Bolivia | 128,662 | 1 0 0 | 3 0 | July, 1901 | 3 9 | 8 9 |
| Le Roi | 200,000 | 5 0 0 | 5 0 | Nov., 1899 | 12 6 | 15 0 |
| Le Roi No. 2 | 120,000 | 5 0 0 | 1 0 | June, 1904 | 12 6 | 15 0 |
| Palmarejo & Mexican | 445,000 | 1 0 0 | rts. | Apr., 1903 | 7 6 | 8 6 |
| Standard | 500,000 | 4 0 | 2½ | Sept., 1903 | 2 6 | 3 6 |
| Stratton Independence | 1,000,007 | 1 0 0 | 6 | Dec., 1903 | 2 0 | 2 6 |
| *St. John del Rey | 546,265 | 1 0 0 | 6 | Dec., 1903 | 10 0 | 11 0 |
| Tomboy | 300,000 | 1 0 0 | 1 0 | June, 1902 | 1 5 0 | 1 10 0 |
| Ymir | 200,000 | 1 0 0 | 1 0 | Mar., 1902 | 2 6 | 5 0 |
| European: | | | | | | |
| Linares | 15,000 | 3 0 0 | 5 0 | Apr., 1904 | 3 0 0 | 3 10 0 |
| Mason & Barry | 185,172 | 1 0 0 | 7 0 | May, 1904 | 2 15 0 | 3 0 0 |
| Rio Tinto | 325,000 | 5 0 0 | 37 6 | May, 1904 | 52 17 6 | 53 2 6 |
| Rio Tinto, preferred | 325,000 | 5 0 0 | 2 6 | May, 1904 | 6 0 0 | 6 5 0 |
| Tharsis | 625,000 | 2 0 0 | 7 0 | May, 1904 | 4 2 6 | 4 7 6 |
| West Australian: | | | | | | |
| Associated | 495,388 | 1 0 0 | 2 6 | July, 1904 | 2 0 0 | 2 2 6 |
| Cosmopolitan | 400,000 | 1 0 0 | 1 0 | Apr., 1904 | 9 3 | 9 9 |
| Golden Horseshoe | 300,000 | 5 0 0 | 6 0 | Aug., 1904 | 6 18 9 | 7 1 3 |
| *Great Boulder | 1,750,000 | 2 0 | 1 0 | June, 1904 | 1 2 6 | 1 3 0 |
| Gt. Boulder Persever'ce | 1,400,007 | 1 0 0 | 1 3 | May, 1904 | 10 9 | 11 0 |
| Great Fingall | 250,000 | 1 0 0 | 7 0 | July, 1904 | 7 11 3 | 7 13 9 |
| Ivanhoe | 200,000 | 5 0 0 | 5 0 | July, 1904 | 7 5 0 | 7 7 6 |
| Kalgurli | 120,000 | 1 0 0 | 2 6 | July, 1904 | 5 6 3 | 5 8 9 |
| Lake View | 250,000 | 1 0 0 | rts. | Aug., 1902 | 1 2 6 | 1 5 0 |
| *Oroya-Brownhill | 450,000 | 1 0 0 | 3 0 | June, 1904 | 3 6 3 | 3 8 9 |
| Miscellaneous: | | | | | | |
| *Brilliant Central | 100,000 | 1 0 0 | 1 0 | July, 1904 | 2 15 0 | 3 0 0 |
| Briseis | 600,000 | 1 0 0 | ..... | ..... | 7 9 | 8 3 |
| Broken Hill | 960,000 | 8 0 | 1 0 | May, 1904 | 1 19 0 | 2 0 0 |
| *Mt. Lyell | 275,000 | 3 0 0 | 1 3 | June, 1904 | 12 6 | 13 6 |
| Mt. Morgan | 1,000,000 | 1 0 0 | 3 | July, 1904 | 2 5 0 | 2 7 6 |
| Waihi | 497,412 | 1 0 0 | 4 6 | June, 1904 | 5 10 0 | 5 12 6 |
| Indian: | | | | | | |
| Champion Reef | 513,832 | 10 0 | 1 3 | May, 1904 | 1 11 3 | 1 12 6 |
| Mysore | 566,043 | 10 0 | 4 6 | July, 1904 | 6 7 6 | 6 10 0 |
| Nundydroog | 484,000 | 10 0 | 1 3 | July, 1904 | 1 10 0 | 1 11 3 |
| Ooregum | 343,000 | 10 0 | 1 3 | Aug., 1904 | 17 6 | 18 9 |
| Ooregum, pfd | 240,000 | 10 0 | 4 | Aug., 1904 | 1 8 9 | 1 11 3 |
| South African: | | | | | | |
| Angelo | 600,000 | 1 0 0 | 7 0 | Aug., 1904 | 6 17 6 | 7 0 0 |
| Bonanza | 200,000 | 1 0 0 | 8 0 | Aug., 1904 | 1 5 0 | 1 7 6 |
| British South Africa | 4,436,019 | 1 0 0 | rts. | May, 1899 | 1 2 6 | 1 5 0 |
| Cape Copper | 300,000 | 2 0 0 | 2 6 | July, 1904 | 3 2 6 | 3 7 6 |
| Cape Copper, pfd | 75,000 | 2 0 0 | 2 6 | July, 1904 | 3 0 0 | 3 5 0 |
| City & Suburban | 340,000 | 4 0 0 | 4 0 | Aug., 1904 | 6 0 0 | 6 5 0 |
| Consol. Gold-Fields | 2,000,000 | 1 0 0 | ..... | ..... | 6 5 0 | 6 7 6 |
| Crown Reef | 120,000 | 1 0 0 | 6 0 | Aug., 1904 | 14 5 0 | 14 15 0 |
| De Beers, preferred | 800,000 | 2 10 0 | 10 0 | July, 1904 | 18 11 3 | 18 8 3 |
| De Beers, deferred | 1,000,000 | 2 10 0 | 12 6 | July, 1904 | 18 8 3 | 18 12 3 |
| East Rand | 990,000 | 1 0 0 | 5 0 | July, 1903 | 7 10 0 | 7 11 3 |
| Ferreira | 90,000 | 1 0 0 | 22 6 | Aug., 1904 | 20 10 0 | 21 0 0 |
| Geldenhuis | 200,000 | 1 0 0 | 7 0 | Aug., 1904 | 5 6 3 | 5 8 9 |
| Geduld | 400,000 | 1 0 0 | rts. | Mar., 1902 | 5 12 3 | 5 18 9 |
| Henry Nourse | 125,000 | 1 0 0 | 8 0 | Aug., 1904 | 8 5 0 | 8 10 0 |
| Jubilee | 50,000 | 1 0 0 | 5 0 | Aug., 1904 | 4 5 0 | 4 15 0 |
| Jumpers | 100,000 | 1 0 0 | 2 6 | May, 1904 | 5 12 6 | 2 17 6 |
| Langlaagte | 470,000 | 1 0 0 | 2 0 | Aug., 1904 | 3 11 3 | 3 11 3 |
| May | 288,750 | 1 0 0 | 3 0 | Aug., 1904 | 3 17 6 | 4 0 0 |
| Meyer & Charlton | 100,000 | 1 0 0 | 5 0 | Aug., 1904 | 5 3 9 | 5 12 6 |
| Modderfontein | 290,000 | 1 0 0 | rts. | Apr., 1902 | 7 18 9 | 8 1 3 |
| Namaqua | 94,331 | 2 0 0 | 3 0 | Dec., 1903 | 2 15 0 | 3 0 0 |
| *New Jagersfontein | 200,000 | 5 0 0 | 10 0 | June, 1904 | 27 5 0 | 27 15 0 |
| New Primrose | 325,000 | 1 0 0 | 3 0 | Aug., 1904 | 3 10 0 | 3 12 6 |
| Rand | 1,795,956 | 5 0 | 5 0 | Aug., 1902 | 9 11 3 | 9 12 3 |
| Robinson | 750,000 | 5 0 0 | 6 0 | Aug., 1904 | 9 2 6 | 9 7 6 |
| Robinson Deep | 950,000 | 1 0 0 | 3 0 | Aug., 1904 | 5 2 6 | 5 5 0 |
| Rose Deep | 425,000 | 1 0 0 | 3 0 | Aug., 1904 | 8 7 6 | 8 12 6 |
| *Salisbury | 100,000 | 1 0 0 | 2 0 | June, 1904 | 1 10 0 | 1 15 0 |
| Village | 400,000 | 1 0 0 | 4 0 | July, 1904 | 4 15 0 | 5 0 0 |
| *Wemmer | 80,000 | 1 0 0 | 12 6 | July, 1904 | 10 10 0 | 11 0 0 |

*Ex-dividend.

## LONDON (By Cable.)*

| Company | Aug. 6 £ | s. | d. | Aug 9 £ | s. | d | Company | Aug. 6 £ | s. | d. | Aug 9 £ | d |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Anaconda | ... | ... | ... | ... | ... | ... | Esperanza | 0 | 19 | 9 | 0 | 19 9 |
| Camp Bird | 1 | 8 | 3 | 1 | 8 | 6 | Modderfontein | 8 | 2 | 6 | 8 | 12 6 |
| Con. Gold Fields | 5 | 16 | 3 | 6 | 1 | 3 | Rand Mines | 9 | 17 | 6 | 9 | 1 3 |
| Dolores | 1 | 0 | 6 | 1 | 1 | 6 | Rio Tinto | 52 | 12 | 6 | 52 | 11 3 |
| East Rand | 7 | 12 | 0 | 7 | 18 | 9 | Simmer & Jack | 1 | 10 | 6 | 1 | 12 6 |
| El Oro | 1 | 3 | 0 | 1 | 2 | 6 | Tomboy | 1 | 2 | 6 | 1 | 2 6 |

*Furnished by Wm. P Bonbright & Co., 15 Wall St., New York

## PARIS. July 28.

| Company. | Location. | Capital Stock. | Par value. | Latest divs. | Prices. Opening | Closing |
|---|---|---|---|---|---|---|
| | | Francs. | Fr. | Fr. | Fr. | Fr. |
| Anzin, Coal | France | ..... | ..... | 290.00 | 5,625.00 | 5,675.00 |
| Boleo, c | Lower Cal. | 12,000,000 | 500 | 104.17 | 1,897.00 | 1,925.00 |
| Champ d'Or, g | S. Africa | 3,375,000 | 25 | 3.75 | 17.50 | 17.50 |
| Courrieres, Coal | France | 600,000 | 500 | 110.00 | 2,860.00 | 2,890.00 |
| Fraser River, g | Brit. Col. | 250,000 | 25 | ..... | 5.50 | 5.50 |
| Huanchaca, s | Bolivia | 40,000,000 | 125 | 2.50 | 101.00 | 98.00 |
| Laurium, z. l | Greece | 16,300,000 | 500 | 25.00 | 300.00 | 310.00 |
| Malfidano, z | Italy | 12,500,000 | 500 | 50.00 | 589.00 | 592.00 |
| Metaux, Cie. Fran. de | France | 25,000,000 | 500 | 22.50 | 482.50 | 481.00 |
| Mokta-el-Hadid, i. l | Algeria | 18,312,000 | 500 | 40.00 | 900.00 | 907.00 |
| Nickel, n | N. Caledonia | 15,000,000 | 250 | 22.50 | 559.50 | 545.00 |
| Penarroya, Coal | Spain | ..... | 500 | 45.00 | 1,026.00 | 1,026.00 |
| Vielle Montagne z | Belgium | 9,000,000 | 30 | 30.00 | 715.00 | 717.00 |

c—Copper. g—Gold. i—Iron. l—Lead. n—Nickel. o—Oil. s—Silver. z—Zinc.

# CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

**(See also Market Reviews.)**

| | | |
|---|---|---|
| **ABRASIVES—** | | |
| Bort as to size | carat, | $10.00@$18.00 |
| Carborundum, f.o.b. Niagara Falls, Powd | lb. | .08 |
| Grains | " | .10 |
| Corundum, N. C. | " | .07@.10 |
| Chester, Mass | " | .04½@.05 |
| Barry's Bay, Ont | " | .07½@.09½ |
| Mont. f.o.b. Chicago | " | .07@.07½ |
| Crushed Steel, f.o.b. Pittsburg | " | .05½ |
| Emery, in kegs: Turkish flour | " | .03½ |
| Grains | " | .05@.05½ |
| Naxos flour | " | .03½ |
| Grains | " | .05@.05½ |
| Chester flour | " | .03½ |
| Grains | " | .05@.05½ |
| Peekskill, f.o.b. Easton, Pa., flour | " | .01½ |
| Grains, in kegs | " | .02½ |
| Crude, ex-ship N. Y.: Abbott (Turkey) lg. ton | | 26.50@30.00 |
| Kuluk (Turkey) | " | 22.00@24.00 |
| Naxos(Greek)h.gr | " | 26.00 |
| Garnet, per quality sh. ton | | 25.00@35.00 |
| Pumice Stone, Am. Powd | lb. | .01½@.02 |
| Italian, powdered | " | .01½ |
| Lump, per quality | " | .04@.05 |
| Rottenstone, ground | " | .02½@.04½ |
| Lump, per quality | " | .06@.20 |
| Rouge, per quality | " | .10@.30 |
| Steel Emery, f.o.b. Pittsburg | " | .07 |
| **ACIDS—** | | |
| Boracic, crystals | " | .10 |
| Powdered | " | .10½ |
| Carbonic, liquid gas | " | .12½ |
| Chromic, crude | " | .19 |
| Hydrofluoric, 30% | " | .03 |
| 48% | " | .05 |
| 60% | " | .11 |
| Sulphurous, liquid anhy. f.o.b. Bound Brook, N. J. | " | .06 |
| **ALCOHOL**—Grain | gal. | 2.47@2.49 |
| Refined wood, 95@97% | " | .60@.65 |
| Purified | " | 1.25@1.30 |
| **ALUM**—Lump | 100 lb. | 1.75 |
| Ground | " | 1.85 |
| Porous | " | 1.00 |
| Powdered | " | 3.00 |
| Chrome, com'l | " | 2.75@3.00 |
| **ALUMINUM—** | | |
| Nitrate | lb. | 1.50 |
| Oxide, com'l, common | " | .06½ |
| Best | " | .20 |
| Pure | " | .80 |
| Hydrated | 100 lb. | 2.60 |
| Sulphate, com'l | " | 1.25@1.50 |
| **AMMONIA—** | | |
| Aqua 16° | lb. | .02½ |
| 18° | " | .02½ |
| 20 | " | .03½ |
| 26 | " | .05 |
| **AMMONIUM—** | | |
| Carbonate, lump | " | .07½ |
| Powdered | " | .08½ |
| Muriate gram | " | .05½ |
| Lump | " | .09½ |
| Nitrate, white pure (99%) | " | .12 |
| Phosphate, com'l | " | .09 |
| Pure | " | .12 |
| **ANTIMONY**—Glass | " | .30@.40 |
| Needle, lump | " | .05½@.06 |
| Powdered, ordinary | " | .05½@.07½ |
| Oxide, com'l white, 95% | " | .09½ |
| Com'l gray | " | .07 |
| Sulphuret, com'l | " | .16 |
| **ARSENIC**—White | " | .03@.03½ |
| Red | " | .06½@.06½ |
| **ASPHALTUM—** | | |
| Barbadoes | " | .02½@.03 |
| Cuban | " | .01½@.03½ |
| Egyptian, crude | " | .06@.07 |
| Gilsonite, Utah, ordin'y | " | .03 |
| Select | " | .03½ |
| San Valentino (Italian) | lg. ton | 16.00 |
| Seyssel (French), mastic | " | 21.00 |
| Trinidad, refined | " | 35.00 |
| Ventura, Cal | " | 32.00 |
| **BARIUM—** | | |
| Carb. Lump, 80@90% | sh. ton | $25.00@$27.00 |
| 92@98% | " | 26.00@29.00 |
| Powdered, 80@90% | lb. | .01½@.02 |
| Chloride, com'l | 100 lb. | 1.50@1.70 |
| Chem. pure cryst | lb. | .05 |
| Nitrate, powdered | " | .05½ |
| Sulphate (Blanc Fixe) | " | .02 |
| **BARYTES—** | | |
| Am. Crude, No. 1 | sh. ton | 9.75 |
| Crude, No. 2 | " | 8.00 |
| Crude, No. 3 | " | 7.00 |
| Snow-white | " | 18.00 |
| Foreign gray | " | 13.50 |
| Snow-white | " | 17.25 |
| Floated | " | 18.75 |
| **BAUXITE**—Ga. or Ala. Mines: | | |
| First grade | lg. ton | 5.25@5.50 |
| Second grade | " | 4.50@4.75 |
| **BISMUTH**—Subnitrate | lb. | 2.00 |
| Subcarbonate | " | 2.25 |
| **BITUMEN**—"B" | " | .03½ |
| "A" | " | .05 |
| **BONE ASH** | " | .02½@.02½ |
| **BORAX** | " | .07½@.07¾ |
| **BROMINE**—Bulk | " | .48 |
| **CADMIUM**—Metallic | " | 1.40 |
| Sulphate | 100 lb | 2.00@2.50 |
| **CALCIUM**—Acetate, gray | " | 1.60 |
| Acetate, brown | " | 1.10 |
| Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J. | sh. ton | 65.00 |
| Carbonate, ppt | lb. | .05 |
| Chloride | 100 lb. | .70@.90 |
| **CEMENT—** | | |
| Portland, Am., 400 lb. | bbl. | .90@1.25 |
| Foreign | " | 1.25@1.75 |
| "Rosendale," 300 lb. | " | .80 |
| Slag cement | " | .75@1.25 |
| **CERESINE—** | | |
| Orange and Yellow | lb. | .13½ |
| White | " | .15 |
| **CHALK**—Lump, bulk | sh. ton | 3.00 |
| Ppt. per quality | lb. | .04@.05½ |
| **CHLORINE**—Liquid | " | .30 |
| Water | " | .10 |
| **CHROME ORE—** | | |
| (50% ch.) ex-ship N. Y. | lg. ton | 24.75 |
| Bricks, f.o.b. Pittsburg | M | 175.00 |
| **CLAY, CHINA**—Am. com., ex-dock, N. Y | lg. ton | 8.25 |
| Am. best, ex-dock, N. Y. | " | 9.25 |
| English, common | " | 10.75 |
| Best grade | " | 16.75 |
| Fire Clay, ordinary | sh. ton | 4.25 |
| Best | " | 6.00 |
| Slip Clay | " | 5.00 |
| **COAL TAR PITCH** | gal. | .08 |
| **COBALT**—Carbonate | lb. | 1.75 |
| Nitrate | " | 1.50 |
| Oxide—Black | " | 2.50 |
| Smalt, blue ordinary | " | .06 |
| Best | " | .20 |
| **COPPERAS**—Bulk | 100 lb. | .47½ |
| In bbls | " | .52½ |
| **COPPER**—Carbonate | lb. | .18@.19 |
| Chloride | " | .25 |
| Nitrate, crystals | " | .35 |
| Oxide, com'l | " | .19 |
| **CRYOLITE** | " | .06½ |
| **EXPLOSIVES—** | | |
| Blasting powder, A | 25-lb. keg | .65 |
| Blasting powder, B | " | 1.40 |
| "Rackarock," A | lb. | 1.40 |
| "Rackarock," B | " | .18 |
| Judson R.R. powder | " | .10 |
| Dynamite (20% nitroglycerine) | " | .13 |
| (30% nitro-glycerine) | " | .14 |
| (40% nitro-glycerine) | " | .15 |
| (50% nitro-glycerine) | " | .16½ |
| (60% nitro-glycerine) | " | .18 |
| (75% nitro-glycerine) | " | .21 |
| Glycerine for nitro | " | .11½@.12½ |
| **FELDSPAR**—Ground | sh. ton | 10.00 |
| **FLINT PEBBLES—** | | |
| Danish, Best | lg. ton | 14.75 |
| French, Best | " | 11.75 |
| **FLUORSPAR—** | | |
| Lump | sh. ton | 8.00@10.00 |
| Ground | " | 11.50@13.50 |
| **FULLER'S EARTH**—Lump | 100 lb. | $0.80 |
| Powdered | " | .85 |
| **GRAPHITE**—Am. f. o. b. Providence, R. I., lump | sh. ton | 8.00 |
| Pulverized | " | 30.00 |
| Am. pulv., other than R. I., f. o. b., New York | " | 45.00 |
| Best flake | " | 150.00 |
| Ceylon, common pulv | lb. | .02½@.03½ |
| Best, pulverized | " | .04@.08 |
| German, com. pulv. | " | .01½@.01½ |
| Best pulverized | " | .01½@.02 |
| Italian, pulverized | " | .01½ |
| **GYPSUM**—Ground | sh. ton | 8.00@8.50 |
| Fertilizer | " | 7.00 |
| Rock | lg. ton | 4.00 |
| English and French | " | 14.00@16.00 |
| **INFUSORIAL EARTH—** | | |
| Ground Am. best | " | 20.00 |
| French | " | 37.50 |
| German | " | 40.00 |
| **IODINE**—Crude | 100 lb. | 2.45 |
| **IRON**—Muriate | lb. | .05 |
| Nitrate, com'l | " | .01½ |
| True | " | .04 |
| Oxide, pure copperas color | " | .05@.10 |
| Purple-brown | " | .02 |
| Venetian red | " | .01@.01½ |
| Scale | " | .01@.03 |
| **KAOLIN**—(See China Clay.) | | |
| **LEAD**—Acetate, white | lb. | .08½@.08¾ |
| Brown | " | .06½@.06½ |
| Nitrate, com'l | " | .06½ |
| "gran | " | .08½ |
| **LIME**—Com., abt. 250 lb. | bbl. | .80 |
| Finishing | " | 1.00 |
| **MAGNESITE**—Greece. | | |
| Crude (95%) | lg. ton | 5.00@5.50 |
| Calcined | sh. ton | 15.50 |
| Bricks, best imp., f.o.b. N. Y. | M. | 155.00 |
| Bricks, domes., per qual., f.o.b. Pittsburg | " | 160@200 |
| **MAGNESIUM—** | | |
| Carbonate, light, fine pd. | lb. | .05 |
| Blocks | " | .07@.09 |
| Chloride, com'l | " | .01½ |
| Fused | " | .20 |
| Nitrate | " | .60 |
| Sulphate | 100 lb. | .55@.95 |
| **MANGANESE—** | | |
| Crude powd. 70@75% binoxide | lb. | .01½@.01½ |
| 75@85% binoxide | " | .01½@.02½ |
| 85@90% binoxide | " | .02½@.03½ |
| 90@95% binoxide | " | .03½@.05½ |
| Carbonate | " | .16@.20 |
| Chloride | " | .04 |
| Ore | unit | .18@.20 |
| **MARBLE**—Flour | sh. ton | 6.00@7.00 |
| **MERCURY**—Bichloride | lb. | .68 |
| **MICA**—N.Y.gr'nd,coarse | sh.ton | 33.00@38.00 |
| Fine | lb. | .00½@.02 |
| Sheets are sold as to size and quality. | | |
| **MINERAL WOOL—** | | |
| Slag, ordinary | sh. ton | 19.00 |
| Selected | " | 25.00 |
| Rock, ordinary | " | 32.00 |
| Selected | " | 40.00 |
| **NICKEL**—Oxide, No. 1 | lb. | 1.00 |
| No. 2 | " | .60 |
| Sulphate | " | .20@.21 |
| **OILS**—Black, reduced 29 gr. 25@30, cold test | gal. | .11@.12 |
| 15, cold test | " | .12@.13 |
| Zero | " | .16½@.17½ |
| Summer | " | .11@.12 |
| Cylinder, dark steam ref. | " | .12½@.14 |
| Dark, filtered | " | .16½@.17½ |
| Light, filtered | " | .18½@.19½ |
| Extra cold test | " | .23@.30 |
| Gasoline, 86@90 | " | .17@.22 |
| Naphtha, crude, 68°@72° | bbl. | 12.40 |
| "Stove | gal. | .15 |
| Linseed, domestic raw | " | .43@.45 |
| Boiled | " | .47 |
| Calcutta, raw | " | .65 |
| **OZOKERITE** | lb. | .11½ |
| **PAINTS AND COLORS—** | | |
| Chrome green, common | " | .03 |
| Pure | " | .16 |
| Yellow, common | " | .10½ |
| Best | " | .14 |
| Lampblack, com'l | " | .04½ |
| Refined | " | .07 |
| Litharge, Am. pow'd | " | .05½@.06 |
| English glassmakers' | " | .08½@.08½ |
| Lithophone | " | .02½@.06½ |
| Metallic, brown | sh. ton | 19.00 |
| Red | " | 16.00 |
| Ocher, Am. common | " | 8.50@9.00 |
| Best | " | 21.25@25.00 |
| Dutch, washed | lb. | .02½ |
| French, washed | " | .01½@.01½ |
| Orange mineral, Am. | " | .07½@.07½ |
| Foreign, as to make | " | .08½@.10½ |
| Paris green, pure, bulk | " | .11 |
| Red lead, American | lb. | 0.06½@0.06½ |
| Foreign | " | .07@.08½ |
| Turpentine, spirits | gal. | .51 |
| White lead, Am., dry | lb. | .05@.05½ |
| American, in oil | " | .06@.06½ |
| Foreign, in oil | " | .09@.09½ |
| Zinc, white, Am., extra dry | " | .04½@.04½ |
| Foreign, red seal, dry | " | .06@.08½ |
| Green seal, dry | " | .06½@.09½ |
| **POTASH—** | | |
| Caustic, ordinary | " | .04½@.04½ |
| Elect. (90%) | " | .05½ |
| **POTASSIUM—** | | |
| Bicarbonate cryst. | " | .08½ |
| Powdered or gran. | " | .14 |
| Bichromate, Am. | " | .08½@.08½ |
| Scotch | " | .08½@.08½ |
| Bromide | " | .30 |
| Carbonate (80@85%) | " | 3.50@4.00 |
| Chlorate, powdered | " | .06½@.07½ |
| Crystals | " | .06½@.07 |
| Chromate | " | .35 |
| Cyanide (98@99%) | " | .19 |
| Kainit | lg. ton | 9.30 |
| Manure salt, 20% | 100 lb. | .66 |
| Double Manure Salt, 48@53% | " | 1.12 |
| Muriate, 80@85% | " | 1.83 |
| 95% | " | 1.86 |
| Permanganate | lb. | .09½@.09½ |
| Prussiate, yellow | " | .14½@.14½ |
| Red | " | .35½@.36 |
| Sulphate, 90% | 100 lb. | 2.11 |
| 96% | " | 2.14 |
| Sylvinit | unit | .41 |
| **QUARTZ**—(See Silica.) | | |
| **SALT**—N. Y. com. fine 280 lb. | bbl. | .72@1.18 |
| N. Y. agricultural | sh. ton | 4.40 |
| **SALTPETRE**—Crude | 100 lb. | 3.65 |
| Refined | " | 4.00@4.50 |
| **SILICA—** | | |
| Ground quartz, ord'ry | sh. ton | 9.00@10.00 |
| Best | " | 12.00@13.00 |
| Lump quartz | " | 2.50@4.00 |
| Glass sand | " | 2.75 |
| **SILVER**—Chloride | oz. | .65 |
| Nitrate Crystals | " | .36½ |
| Oxide | " | .85@1.10 |
| **SODIUM—** | | |
| Bicarb., ord., bulk, f.o.b. works | 100 lb. | 1.30 |
| Extra domes, f.o.b. works | " | 3.50 |
| Bichromate | lb. | .06½ |
| Carbonated ash, high test, in bags, f.o.b. works | 100 lb. | .75@.77½ |
| Foreign, f.o.b. N. Y. | " | .85@.87½ |
| Caustic, 70@76%, f.o.b. works | " | 1.77½@1.85 |
| Foreign, f.o.b. N. Y. | " | 1.90@1.95 |
| Chlorate, com'l | " | .06½@.06½ |
| Hyposulphite, Am | " | 1.60@1.65 |
| German | " | 1.70@1.90 |
| Nitrate, spot and nearby | " | 2.15@2.17½ |
| Shipments | " | 2.20@2.22½ |
| Peroxide | lb. | .45 |
| Phosphate | " | .02½@.02½ |
| Prussiate | " | .09½ |
| Sal soda, f.o.b. works | 100 lb. | .60 |
| Foreign, f.o.b. N. Y. | " | .67½ |
| Silicate, concentrated | lb. | .05 |
| Com'l | " | .01 |
| Sulphate, com'l | 100 lb. | .60 |
| Sulphide, crystals, bbl. | lb. | .01½ |
| Sulphite crystals | " | .02½ |
| **SULPHUR**—Roll | 100 lb. | 1.85 |
| Flour | " | 1.90 |
| Flowers, sublimed | " | 2.20 |
| **TALC**—N. C., 1st grade | sh. ton | 20.00 |
| N. Y., Fibrous, best | " | 10.25 |
| French, best | 100 lb. | 2.50 |
| Italian, best | " | 2.25 |
| **TAR**—Regular | bbl. | 2.25 |
| Oil, | " | 5.00 |
| **TIN**—Crystals, bbl. | lb. | .17 |
| Oxide | " | .35 |
| **URANIUM**—Oxide | " | 2.25@3.00 |
| **ZINC**—Metallic, ch. pure | " | .07@.09½ |
| Carbonate, ppt | " | .09 |
| Chloride solution, com'l | " | .02½ |
| Chloride granular | " | .04½@.04½ |
| Dust | " | .05½@.05½ |
| Sulphate | " | .02 @.02½ |

## The Rare Earths.

| | | |
|---|---|---|
| **BORON**—Nitrate | lb. | $1.50 |
| **CALCIUM**—Tungstate (Scheelite) | " | .60 |
| **CERIUM**—Nitrate | " | 10.00 |
| **DIDYMIUM**—Nitrate | " | 35.00 |
| **ERBIUM**—Nitrate | " | 40.00 |
| **GLUCINUM**—Nitrate | " | 20.00 |
| **LANTHANUM**—Nitrate | " | 30.00 |
| **LITHIUM**—Carbonate | " | 1.50 |
| **LITHIUM**—Nitrate | oz. | .60 |
| **STRONTIUM**—Nitrate | lb. | .07@.07½ |
| **THORIUM**—Nit. 49@50% | " | 4.50 |
| **URANIUM**—Nitrate | oz. | .25 |
| **ZIRCONIUM**—Nitrate | lb | 8.00 |

Note.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the Engineering and Mining Journal are requested to report any corrections needed, or to suggest additions which they may consider advisable.